CDP-XA50ES

SERVICE MANUAL

AEP Model
E Model

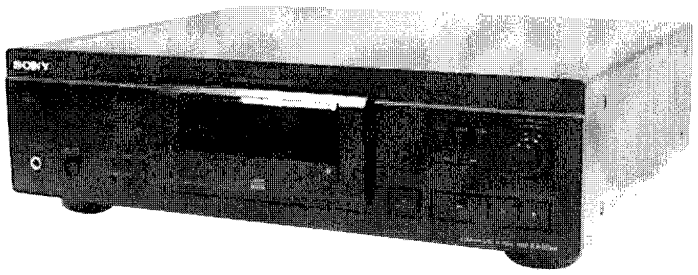


Photo: Black

Model Name Using Similar Mechanism	NEW
CD Mechanism Type	CDM32BB-12B (BLACK) CDM32BN-12B (GOLD)
Base Unit Name	BU-12B
Optical Pick-up Name	KSS-273B/J1N

SPECIFICATIONS

Compact disc player

Laser Semiconductor laser (λ = 780 nm)
Emission duration: continuous

Laser output Max 44.6 μW*
* This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up block with 7 mm aperture.

Frequency response 2 Hz to 20 kHz ±0.3 dB

Dynamic range More than 100 dB

Harmonic distortion Less than 0.0017 %

Outputs

	Jack type	Maximum output level	Load impedance
LINE OUT (FIXED)	Phono jacks	2 V (at 50 kilohms)	Over 10 kilohms
LINE OUT (VARIABLE)	Phono jacks	2 V (at 50 kilohms)	Over 50 kilohms
DIGITAL OUT (OPTICAL)	Optical output connector	–18 dBm	Wave length: 660 nm
DIGITAL OUT (COAXIAL)	Coaxial output connector	0.5 Vp-p (75 ohms)	75 ohms
PHONES	Stereo phone jack	28 mW	32 ohms

– Continuedon next page –

COMPACT DISC PLAYER

MICROFILM

SONY®

General

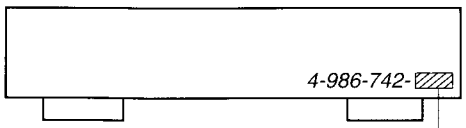
Power requirements	220 V – 230 V AC, 50/60 Hz
Power requirements	
Power consumption	20 W
Dimensions (approx.) (w/h/d)	430 × 125 × 375 mm (17 × 5 × 14 7/8 in.) incl. projecting parts
Mass (approx.)	15.2 kg (33 lbs 8 oz)

Supplied accessories

Audio cord (2 phono plugs – 2 phono plugs) (1)
Remote commander (remote) (1)
Sony SUM-3 (NS) batteries (2)
Stabiliser (1)

Design and specifications are subject to change without notice.

MODEL IDENTIFICATION
– BACK PANEL –



AEP Model : 1 □ (CED)
Singapore Model : 2 □ (SP)

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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SECTION 1
SERVICING NOTES

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic break-down because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic break-down and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe from more than 30 cm away from the objective lens.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

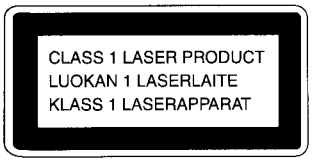
Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270 °C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

CAUTION

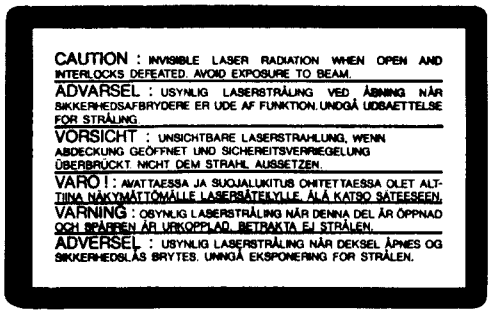
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.



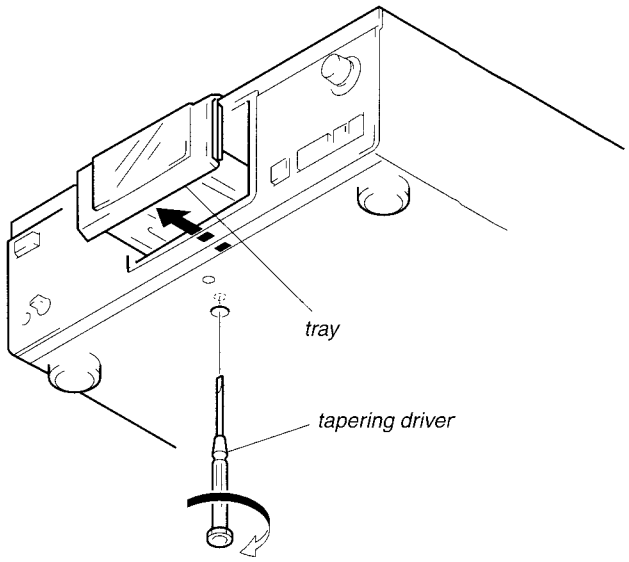
Laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

The following caution label is located inside the unit.


CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSAETTELSE FOR STRÅLING.
VORSICHT : UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT. NICHT DEM STRAHL AUSSETZEN.
VARO ! : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING : OSYNLIG LASERSTRÅLING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.
ADVERSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.

1-1. HOW TO OPEN THE DISC TRAY WHEN POWER SWITCH TURNS OFF

Insert a tapering driver into the aperture of the unit bottom, and turn in the direction of arrow (to OUT direction).

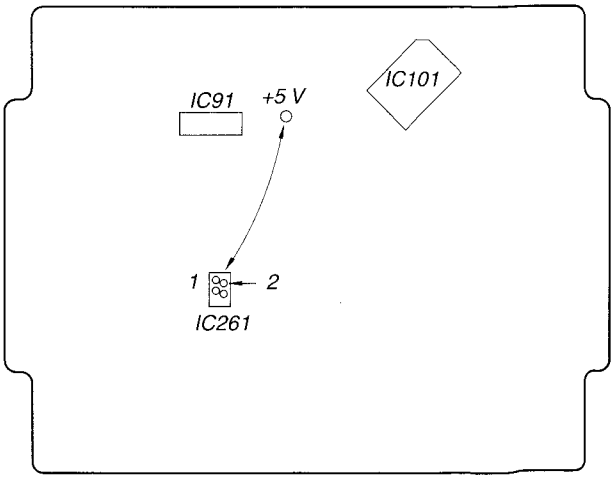


** To close the disc tray, turn the tapering driver in the reverse direction (to IN direction).*

1-2. PREPARATION FOR ADJUSTMENT AND MEASUREMENT

Perform connecting the IC261 pin ② of SERVOboard to the line of +5V because this unit does not work without the stabilizer structurally.

[SERVO BOARD] – Conductor side –

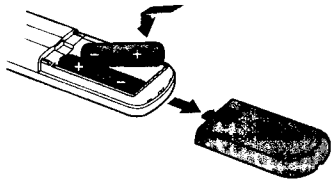


Unpacking

Check that you received the following items:
- Audio connecting cord (1)
- Remote commander (remote) (1)
- Sony SUM-3 (NS) batteries (2)
- Stabiliser (1)

Inserting batteries into the remote

You can control the player using the supplied remote. Insert two R6 (size AA) batteries by matching the + and – on the batteries. When using the remote, point it at the remote sensor ■ on the player.



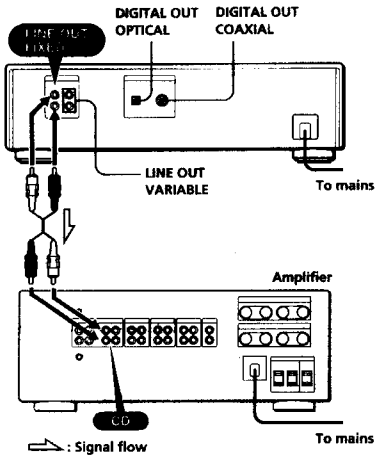
When to replace batteries
With normal use, the batteries should last for about six months. When the remote no longer operates the player, replace all the batteries with new ones.

Notes
- Do not leave the remote near an extremely hot or humid place.
- Do not drop any foreign object into the remote casing, particularly when replacing the batteries.
- Do not expose the remote sensor to direct sunlight or lighting apparatuses. Doing so may cause a malfunction.
- If you don't use the remote for an extended period of time, remove the batteries to avoid possible damage from battery leakage and corrosion.

Hooking Up the System

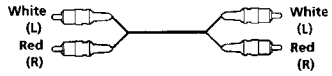
Overview

This section describes how to hook up the CD player to an amplifier. Be sure to turn off the power of each component before making the connections.



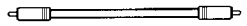
What cords will I need?

■**When making analog hookups**
- Audio cord (supplied) (1)



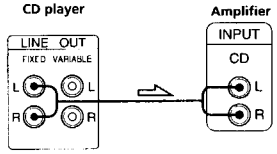
■**When making digital hookups**
- Optical cable POC-15 (not supplied)

- Coaxial cable (not supplied)

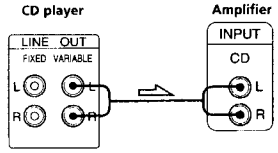


Hookups

■**When making analog hookups**
When connecting an audio cord, be sure to match the colour-coded cord to the appropriate jacks on the components: Red (right) to Red and White (left) to White. Be sure to make connections firmly to avoid hum and noise.

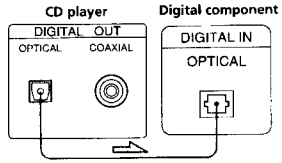


- **If you have an analog power amplifier**
Connect the amplifier via the VARIABLE LINE OUT jacks using the supplied audio cord. You can adjust the output level with the LINE OUT/PHONE LEVEL control on the player or the LINE OUT LEVEL buttons on the remote.

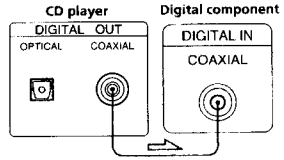


■**When making digital hookups**
You can avoid deterioration of the signal during transmission, since the music signal output through the digital output connectors retains digital form. You can connect a digital component such as a digital amplifier, D/A converter, DAT or MD. When you connect a DAT or MD, you can make digital recordings from CDs.
Note that you cannot use fading in or out function (page 19) when making this connection.

- **If you have a digital component with an optical digital input connector**
Connect the component via the DIGITAL OUT (OPTICAL) connector using the optical cable (not supplied). Take off the cap and plug in the optical cable.



- **If you have a digital component with a coaxial digital input connector**
Connect the component via the DIGITAL OUT (COAXIAL) connector using the coaxial cable (not supplied).



Note
When you connect via the DIGITAL OUT connector, noise may occur when you play CD software other than music, such as a CD-ROM.

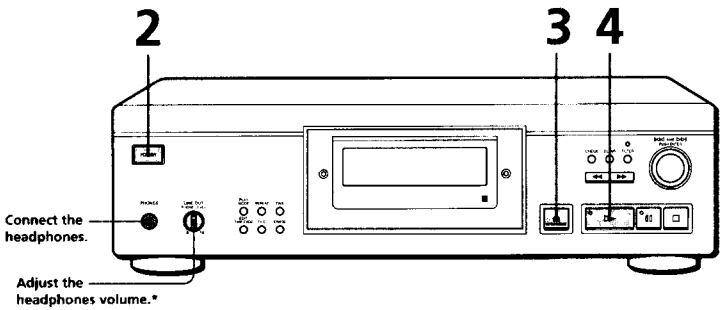
Connecting the mains lead

Connect the mains lead to a wall outlet.

Removing the notice sheet

The notice sheet is put on the player. Remove the sheet before you use your player.

Playing a CD



* The output level from the LINE OUT VARIABLE jacks will also change.

• See pages 4 – 5 for the hookup information.

If you turn on the player with a CD in the tray
You can start playing automatically from the beginning of the CD. If you connect a commercially available timer, you can start playing the CD at any time you want.

1 Turn on the amplifier and select the CD player position.

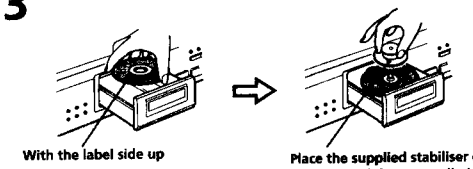
2 Press POWER to turn on the player.

If "- - - - -" appears in the display
Place the supplied stabiliser on the CD.
If you do not, this indication appears.

Note
In Step 3, do not place two or more CDs at the same time.
If you do so, you may damage the discs and/or the player.

If play doesn't start from the first track
Press PLAY MODE repeatedly until "SHUFFLE," "PROGRAM" and "CUSTOM INDEX" disappear from the display (or press CONTINUE on the remote).

3 Press ⏏ OPEN/CLOSE, and place a CD on the tray.


With the label side up
Place the supplied stabiliser on the CD. (The stabilisers supplied with the CDP-XA50ES and CDP-XA30ES are different.)

4 Press ▷.
The disc tray closes and the player plays all the tracks once (Continuous Play).
Adjust the volume on the amplifier.

To stop playback

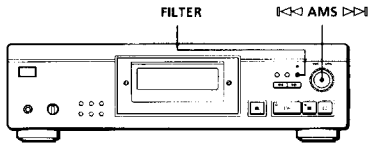
Press □.

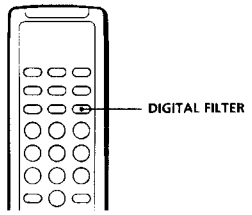
When you want to	You need to
Pause	Press II
Resume play after pause	Press II or ▷
Go to the next track	Turn I◁◁ AMS ▷▷I clockwise. (When using the remote, press ▶▶I.)
Go back to the preceding track	Turn I◁◁ AMS ▷▷I anticlockwise. (When using the remote, press I◀◀.)
Stop play and remove the CD	Press ⏏ OPEN/CLOSE

Playing CDs

Customising the Sound of Your Music (Digital Filter Function)

This player has a variable coefficient (V.C.) digital filter. By selecting the type of filter you want, you can adjust the sound to match your system, your room, the music source, etc.





Selecting the filter directly on the player

1 Press FILTER.
The display shows the currently selected filter number and the filter indicator flashes.

2 Turn ⏮ AMS ⏭ until the digital filter number you want appears in the display.
As you turn the ⏮ AMS ⏭ control, the digital filter number changes cyclically as follows:

→ STD → 1 → 2 → 3A → 3b → 3C → 4A → 4b → 4C →

If you are playing a disc, the sound will be interrupted momentarily.

3 Push ⏮ AMS ⏭ to select the filter.
The original display reappears.
The selected digital filter number is stored in memory even if you turn off the power.

You can also change the digital filter number by pressing the FILTER button while the indicator is flashing

Selecting the filter using the remote

1 Press DIGITAL FILTER.
The display shows the currently selected filter number and the filter indicator flashes.

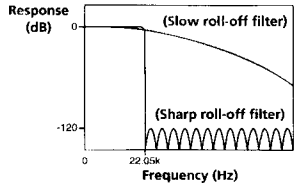
2 Press DIGITAL FILTER repeatedly until the display shows the digital filter number you want.
The digital filter number is stored and the original display reappears.

What is a variable coefficient (V.C.) digital filter?

CD players use digital filters to eliminate the noise generated during sampling. You can change the tone of your music by changing the cutoff characteristics of the digital filter.
This player has five types of filters with different coefficient characteristics: "STD," "1," "2," "3" and "4." In addition, digital filters "3" and "4" each have three coefficient patterns, A–C, for more detailed adjustments.
The following explains the terms you need to know to understand the characteristics of the digital filters used in this player.

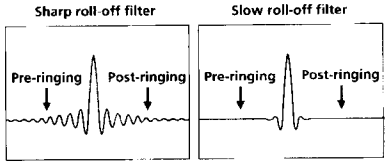
Sharp roll-off and slow roll-off

Digital filters can be roughly classified into sharp roll-off types and slow roll-off types, according to their cutoff characteristics.



Comparison of cutoff characteristics for sharp roll-off filter and slow roll-off filter

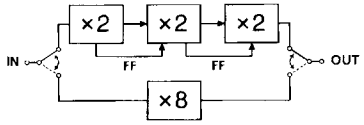
Sharp roll-off filters steeply cut off the noise generated during sampling over 22.05 kHz. This is a superior way of completely reproducing signals below 20 kHz: the basic principle behind digital audio.
On the other hand, slow roll-off filters cut off the noise generated during sampling gradually, and are able to hold pre-ringing and post-ringing (a kind of sound smearing) in the impulse response signal to a minimum.



Comparison of impulse response for sharp roll-off filter and slow roll-off filter

Cascade type and direct type

There are two methods of digital filter oversampling: the cascade type and direct type. The cascade type multiplies the signal by eight in three stages, and the direct type multiplies the signal by eight in one step.
Cascade filters have a high calculation efficiency, and can realise steep, high-precision sharp roll-off characteristics. Moreover, the ICs in this player use the full feed-forward (FF) method between each of the stages to improve the accuracy of the information transfer.
On the other hand, eightfold oversampling data can be obtained in one step with direct filters and there is no loss during transfer between calculation stages.
However, since such circuits are extremely large, this player can only support slow roll-off filters.



Characteristics of each digital filter

The following are the settings and characteristics for each of the five digital filters. Use this information to select the filter you want.

STD: Standard

This is a sharp roll-off, cascade type filter. It has the same characteristics as the digital filters that have long been used in Sony's high-end units and has a sharp cutoff that reaches –120 dB at 24 kHz. This filter uses the full feed-forward method between the calculation stages and gives the sound a wide range and ample spatial representation.

1: Spline

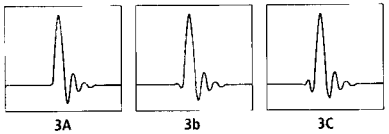
This is a slow roll-off, cascade type filter that uses a cubic spline function for interpolation. The spline function features smoother connections between points, and among spline functions, the cubic filter is the most straightforward. Ringing in the impulse response for this filter is much lower than for a sharp roll-off type filter. With this filter, the sound image is clear and sound reproduction is smooth.

2: Plain

This is a slow roll-off, direct type filter. It features an absence of quantization between the digital filter output and the D/A converter input.
Direct type calculations are used within the digital filter and the bit length for the digital filter output and the D/A converter input are the same, so no requantization noise is generated between the digital filter and the D/A converter. This means that, of the 16-bit information taken from the disc, elements up to 20 kHz are input as far as the D/A converter without any nonlinear operation. This reproduces a sound with high clarity and strength.

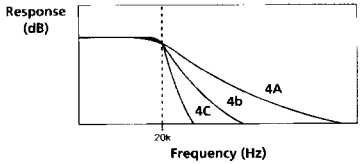
Playing CDs

3: Analog type
This is a slow roll-off, direct type filter that simulates a seventh-order analog Butterworth filter. This filter completely prevents pre-ringing in the impulse response. Also, since it simulates an analog filter, the high-region phase outside the audible frequency is rotated. The filters from 3A to 3C differ in degree of phase rotation. 3A is multiplied by one (the true analog characteristic), 3b is multiplied by 0.75, and 3C is multiplied by 0.5. The impulse response changes as shown in the figures below. The degree of pre-ringing and post-ringing varies with the degree of phase change. This gives the sound a feeling of warmth and depth.



Comparison of filter 3 impulse response

4: Butterworth
This is a slow roll-off, direct type filter and includes fifth-order through ninth-order Butterworth filters. However, the phase is linear and does not include the phase change possibilities of filter 3 (analog type). As the figure below shows, only the cutoff characteristics can be changed in the fifth-order (4A), the seventh-order (4b) and the ninth-order (4C). Ringing in the impulse response increases from the fifth-order filter to the ninth-order filter. This filter gives the sound a feeling of balance and comfort.

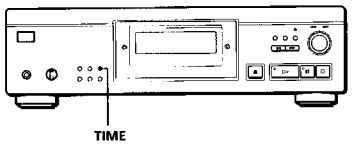


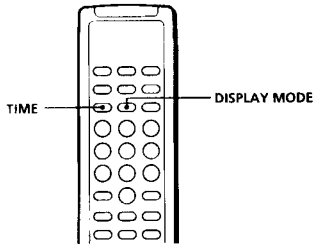
Comparison of filter 4 cutoff characteristics

Note
The Digital Filter function primarily changes characteristics outside the audible frequency. They cannot affect changes within the audible frequency such as those provided by the tone controls of the amplifier. Therefore, with certain combinations of hardware and software, there may be no noticeable effect after switching the filter.

Using the Display

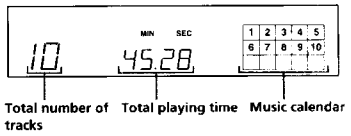
You can check information about the disc using the display.





Checking the total number and playing time of the tracks

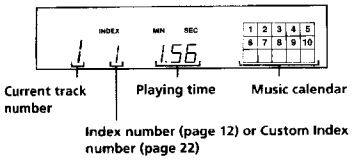
Press TIME before you start playing.
The display shows the total number of tracks, total playing time and music calendar.



While in Shuffle Play mode ("SHUFFLE" appears in the display; see page 13), a one-second access time blank is added between each track. This increase is automatically added to the total playing time in the display.
If the disc has more than 15 tracks, the ▶ indication appears next to 15 on the music calendar.
The information also appears when you press ⏏ OPEN/CLOSE to close the disc tray.

Display information while playing a disc

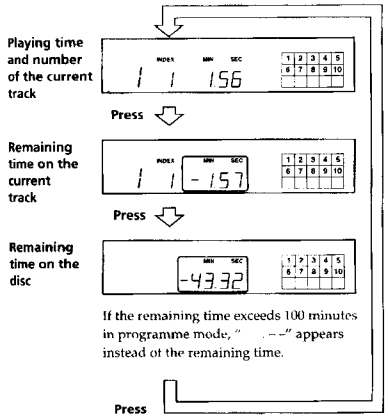
While playing a disc, the display shows the current track number, index number, playing time and the music calendar.



The track numbers in the music calendar disappear after they are played.

Checking the remaining time

Each time you press TIME while playing a disc, the display changes as shown in the chart below.



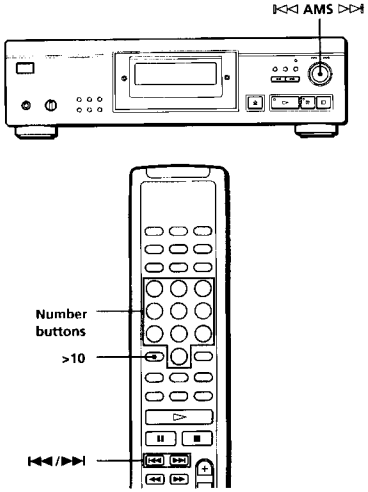
If the remaining time exceeds 100 minutes in programme mode, "– –" appears instead of the remaining time.

Turning off the music calendar in the display

Each time you press DISPLAY MODE on the remote while playing a disc, the music calendar turns off and on alternately in the display.

Locating a Specific Track

You can quickly locate any track while playing a disc using the AMS (Automatic Music Sensor) on the player or number buttons on the remote.



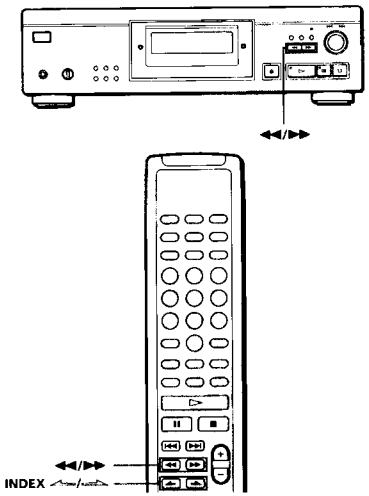
To locate	You need to
The next or succeeding tracks	Turn ⏮ AMS ⏭ clockwise until you find the track. When using the remote, press ⏭ repeatedly until you find the track.
The current or preceding tracks	Turn ⏮ AMS ⏭ anticlockwise until you find the track. When using the remote, press ⏮ repeatedly until you find the track.
A specific track directly	Press the number button of the track on the remote

When you directly locate a track numbered over 10
Press >10 first, then the corresponding number buttons on the remote. To enter "0," use button 10.
Example: To play track number 30
Press >10 first, then 3 and 10.

Playing CDs

Locating a Particular Point in a Track

You can also locate a particular point in a track while playing a disc.



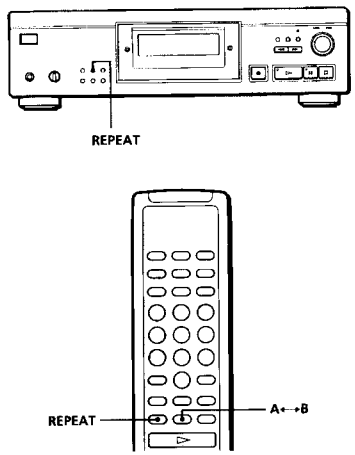
To locate a point	Press
While monitoring the sound	▶▶ (forward) or ◀◀ (backward) and hold down until you find the point
Quickly by observing the display during pause	◀◀/▶▶ and hold down until you find the point. You will not hear the sound during the operation.
Using an index (only for indexed discs)	INDEX ⏮/⏭ on the remote repeatedly until you find the point

What is an index?
It is a number that divides a track or a disc into sections, enabling you to easily locate a desired point. You can determine if a disc uses indexes by its packaging.

Note
If "↻↻" appears in the display, the disc has reached the end while you were pressing ▶▶. Press ◀◀ or turn ⏮ AMS ⏭ anticlockwise to go back.

Playing Tracks Repeatedly

You can play tracks repeatedly in any play mode.



Press REPEAT while playing a disc.
"REPEAT" appears in the display. The player repeats the tracks as follows:

When the disc is played in	The player repeats
Continuous Play (page 6)	All the tracks
Shuffle Play (page 13)	All the tracks in random orders
Programme Play (page 14)	The same programme
Delete Play (page 16)	All the remaining tracks
Delete Shuffle Play (page 14, 16)	All the remaining tracks in random orders
Custom Index Play (page 23)	The portion between two indexes

To cancel Repeat Play
Press REPEAT repeatedly until "REPEAT" disappears from the display.

Repeating the current track

You can repeat only the current track.

While the track you want is being played, press REPEAT repeatedly until "REPEAT 1" appears in the display.

Note
You cannot repeat the current track while the disc is played in Custom Index Play mode (see page 23).

Repeating a Specific Portion (A↔B Repeat)

You can play a specific portion in a track repeatedly. This might be useful when you want to memorise lyrics.
Note that you cannot repeat a portion extending to two tracks.

1 While playing a disc, press A↔B on the remote when you find the starting point (point A) to be played repeatedly.
"A-" of "REPEAT A-" flashes in the display.

2 When you reach the ending point (point B), press A↔B again.
"REPEAT A-B" appears. The player plays this specific portion repeatedly.

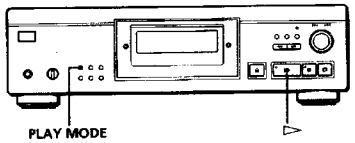
To cancel A↔B Repeat
Press REPEAT.

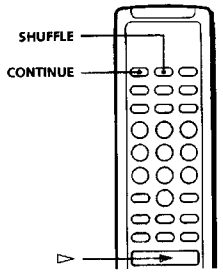
Setting a new starting point
You can move the repeating portion ahead by changing the starting point.
1 Press A↔B while the player is repeating the specific portion.
The ending point B becomes the new starting point A. "A-" of "REPEAT A-" flashes in the display.
2 When you reach the ending point (point B), press A↔B again.
"REPEAT A-B" appears. The player repeats between the new starting and ending points.

When you want to restart from the starting point A
Press ▷ during A↔B Repeat.

Playing in Random Order (Shuffle Play)

You can have the player "shuffle" tracks and play in a random order.





1 Press PLAY MODE repeatedly until "SHUFFLE" appears in the display.
When using the remote, press SHUFFLE.

2 Press ▷ to start Shuffle Play.
The 🔀 indication appears while the player is "shuffling" the tracks.

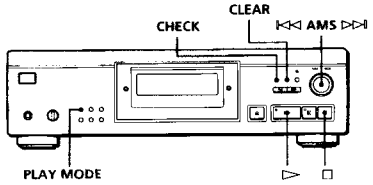
To cancel Shuffle Play
Press PLAY MODE four times (or CONTINUE on the remote).

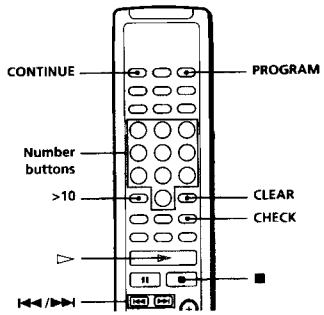
You can start Shuffle Play while playing
Press PLAY MODE once (or SHUFFLE on the remote), and Shuffle Play starts from the current track.

You can delete unwanted tracks during Shuffle Play (Delete Shuffle Play)
Press the number button of the track you want to delete on the remote.
The track number and "OFF" appear in the display, and then the track number disappears from the music calendar.
If you want to restore the track, press the number button again.
To restore all the tracks, press □ in stop mode.

Creating Your Own Programme (Programme Play)

You can arrange the order of the tracks on a disc and create your own programme. The programme can contain up to 24 tracks.

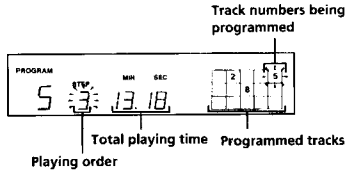




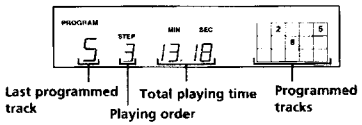
Creating a programme on the player

1 Press PLAY MODE repeatedly until "PROGRAM" appears in the display before you start playing.

2 Turn ⏮ AMS ⏭ until the track number you want appears in the display.
The playing order and the track numbers being programmed flash and the total playing time including the track appears in the display.



3 Push ⏮ AMS ⏭ to select the track.



If you've made a mistake
Press CLEAR, then repeat Steps 2 and 3.

4 Repeat Steps 2 and 3 to programme the tracks in the order you want.

5 Press ▷ to start Programme Play.

To cancel Programme Play
Press PLAY MODE three times.

When tracks, which aren't numerically consecutive on the disc, are programmed consecutively (i.e. 1, 3, 5 etc.)
A one-second access time blank is added between the tracks.

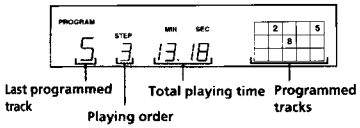
The programme remains even after the Programme Play ends
When you press ▷, you can play the same programme again.

Notes
- "– – . – –" appears instead of the total playing time in the display when it exceeds 100 minutes.
- "FULL" appears in the display when you try to add a track to a programme which already contains 24 tracks.

Creating a programme using the remote

1 Press PROGRAM before you start playing.
"PROGRAM" appears in the display.

2 Press number buttons of the tracks you want to programme in the order you want.
Example: To programme the tracks 2, 8 and 5
Press number buttons in the order 2, 8 and 5.



To select a track with a number over 10
Use >10 button (see page 11).

If you've made a mistake
Press CLEAR, then press the correct track number.

3 Press ▷ to start Programme Play.

To cancel Programme Play
Press CONTINUE.

You can check the total playing time while programming using the remote (Programme Edit)
To select a track, press ⏮ or ⏭ and check the total playing time. Then press PROGRAM to confirm your selection.

When tracks, which aren't numerically consecutive on the disc, are programmed consecutively (i.e. 1, 3, 5 etc.)
A one-second access time blank is added between the tracks.

The programme remains even after the Programme Play ends
When you press ▷, you can play the same programme again.

Notes
- "– – . – –" appears instead of the total playing time in the display when it exceeds 100 minutes.
- "FULL" appears in the display when you try to add a track to a programme which already contains 24 tracks.

Checking the track order

You can check your programme before or after you start playing.

Press CHECK.
Each time you press this button, the display shows the track number in the programmed order. After the last track in the programme, the display shows "End" and returns to the original display. If you check the order after you start playing, the display shows only the remaining track numbers.

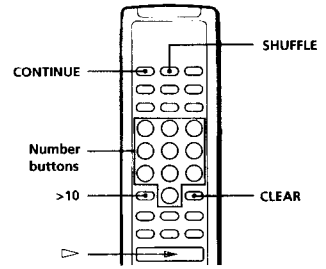
Changing the track order

You can change your programme before you start playing.

To	You need to
Erase a track	Press CHECK until the track you don't want appears in the display, then press CLEAR
Erase the last track in the programme	Press CLEAR. Each time you press the button, the last track will be cleared.
Add tracks to the end of the programme	Turn I◁◁ AMS ▷▷I until track number you want to add appears, then push I◁◁ AMS ▷▷I. When using the remote, press the number button of the tracks to be added.
Change the whole programme completely	Hold down CLEAR until "ALL CLr" appears in the display. Create a new programme following the programming procedure.

Playing Only Specific Tracks (Delete Play)

You can delete unwanted tracks and play only the remaining tracks.



1 Press SHUFFLE.
"SHUFFLE" appears in the display.

2 Press the number buttons of the tracks you want to delete.
The track numbers disappear from the music calendar after "OFF" appears for a while.
To delete a track numbered over 10, use the >10 button (see page 11).

If you've made a mistake
Press the number button of the track. "On" appears in the display and the track will be restored.

3 After you've deleted all the tracks you don't want, press CONTINUE.
"SHUFFLE" disappears from the display.

If you press PLAY MODE on the player instead of CONTINUE on the remote
The deleted tracks will be restored. Be sure to do this step with the remote.

4 Press ▷ to start Delete Play.

To cancel Delete Play
Press ■ in stop mode.

The player keeps the deleted tracks in memory even after the Delete Play ends
When you press ▷, you can play only the remaining tracks again.

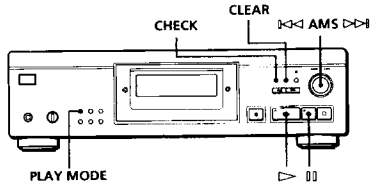
You can play the tracks in random order (Delete Shuffle Play)
Just skip Step 3 in the above procedure.

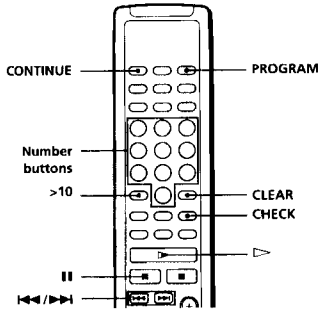
You can delete a track while playing
Press CLEAR while the track is being played. The player deletes the track and starts playing the next track.

You can store the deleted tracks of each disc
See "Storing Specific Tracks of a Disc" on page 24.

Recording Your Own Programme

You can record the programme you've created on a tape, DAT or MD. The programme can contain up to 24 tracks.
By inserting a pause during programming, you can divide the programme into two for recording on both sides of a tape.





1 Create your programme (for side A when recording on a tape) while checking the total playing time indicated in the display.
See "Creating Your Own Programme" on page 14.

2 When you record on both sides of the tape, press II to insert a pause.
The "P" indication appears in the display and the playing time is reset to "0.00."
When you record on one side of the tape or on a DAT or MD, skip this step and go to Step 4.

A pause is counted as one track
You can programme up to 23 tracks when you insert a pause.

3 Repeat Step 1 to create the programme for side B.

4 Start recording on the deck and then press ▷ on the player.
When you record on both sides of the tape, the player pauses at the end of the programme for side A.

5 When you record on side B, reverse the tape and press ▷ or II on the player to resume playing.

To check and change your programme
See pages 15 and 16.
"SIDE-A" appears while checking the programme for side A and "SIDE-B" while checking the programme for side B.

You can automatically insert a blank space of 3 seconds between each track
Use the Auto Space function (see page 21).

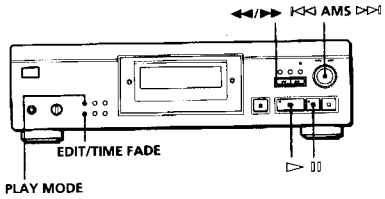
Recording From CDs

Recording a CD by Specifying Tape Length (Time Edit/Just Edit)

You can have the player create a programme that will fit the length of the tape. Select one of the following options:

- Time Edit: automatically creates a programme, keeping the original order of the disc.
- Just Edit: automatically arranges the track order to fit the tape length.

The programme can contain up to 24 tracks (a pause inserted between tracks is counted as one track). Note that tracks whose numbers are over 24 cannot be programmed.



1 Press EDIT/TIME FADE before you start playing as follows:

- To select Time Edit, press the button once. "EDIT" appears and "SIDE-A" flashes in the display.
- To select Just Edit, press the button twice. "(JUST EDIT)" appears and "SIDE-A" flashes in the display.

2 Press ◀◀ or ▶▶ to specify the tape length. Each time you press these buttons, the display changes as shown below, with the tape length of one side following each indication.

HALF ↔ C-46 ↔ C-54 ↔ C-60 ↔ C-74 ↔ C-90 ↔ ...
(23:00) (27:00) (30:00) (37:00) (45:00)

When you select "HALF"
The player sets the programme of each side to a half of the total playing time of the disc. Note that you cannot select "HALF" when the disc has more than 24 tracks.

3 Press EDIT/TIME FADE to have the player create the programme.
The display shows the tracks to be recorded. "SIDE-B" flashes in the display.

4 When you record on both sides of the tape, press EDIT/TIME FADE again.
The player inserts a pause, then creates the programme for side B. The display shows the programmed tracks.
When you record on one side of the tape or on a DAT or MD, skip this step.

5 Start recording on the deck and then press ▷ on the player.
When you record on both sides of the tape, the player pauses at the end of the programme for side A.

6 When you record on side B, reverse the tape and press ▷ or II on the player to resume playing.

To cancel Time Edit/Just Edit
Press PLAY MODE repeatedly until "SHUFFLE," "PROGRAM" and "CUSTOM INDEX" disappear from the display (or press CONTINUE on the remote).

You can programme the tracks you want in advance
Select the tracks before doing the above procedure. The player creates a programme from the remaining tracks. In this case, you cannot select "HALF" to specify the tape length.

You can freely specify the tape length
Set the tape length using I◀◀ AMS ▷▷I.
Example: When the tape length of one side is 30 minutes and 15 seconds
1 To set the minutes, turn I◀◀ AMS ▷▷I until "30" appears in the display, then push I◀◀ AMS ▷▷I.
2 To set the seconds, turn I◀◀ AMS ▷▷I until "15" appears in the display, then push I◀◀ AMS ▷▷I.

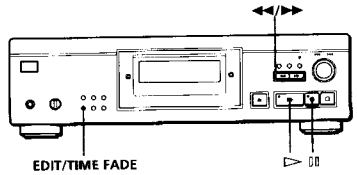
When tracks, which aren't numerically consecutive on the disc, are programmed consecutively (i.e. 1, 3, 5 etc.)
A one-second access time blank is added between the tracks.

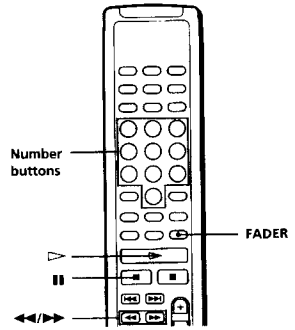
You can automatically insert a blank space of 3 seconds between each track
Use the Auto Space function (see page 21).

You can check and change the programme
See pages 15 and 16.

Fading In or Out

You can manually fade in or out to prevent tracks from starting or ending abruptly.
Note that you cannot use this effect when you use the DIGITAL OUT connector.





To	Press FADER
Start play fading in	During pause. "FADE" flashes and play fades in.
End play fading out	When you want to start fading out. "FADE" flashes. The play fades out and the player pauses.

Recording From CDs

Changing the fading time

You can change the fading time from 2 to 10 seconds before fading in or out. If you don't change it, fading lasts for 5 seconds.

1 Press FADER before you start playing.
"5 SEC" appears and "FADE" flashes in the display.

2 Press the number button to specify the fading time.
You can also specify the fading time by pressing the ◀◀/▶▶ buttons until the display shows the time you want.

Fading out at the specified time (Time Fade)

You can have the player fade out automatically by specifying the playing time. Once you set the Time Fade, it works twice, that is, the play fades out at the end of both sides of a tape.

1 Press EDIT/TIME FADE three times before you start playing.
"(TIME FADE)" and "SIDE-A" appear in the display.

2 Press ◀◀ or ▶▶ to specify the playing time.
Each time you press these buttons, the display changes as shown below, with the playing time of one side following each indication.

HALF ↔ C-46 ↔ C-54 ↔ C-60 ↔ C-74 ↔ C-90 ↔
(23.00) (27.00) (30.00) (37.00) (45.00)

When you select "HALF"
The player sets the playing time to a half of the total playing time.

3 Press ▷ to start playing.
At the specified time the play fades out with "FADE" flashing in the display and the player pauses. "SIDE-B" appears in the display.

4 To record on side B, reverse the tape and press ▷ or ▯▯ on the player to resume playing.
Again, the play fades out at the specified time.

To cancel Time Fade
Press EDIT/TIME FADE.

You can freely specify the playing time
See "You can freely specify the tape length" on page 19.

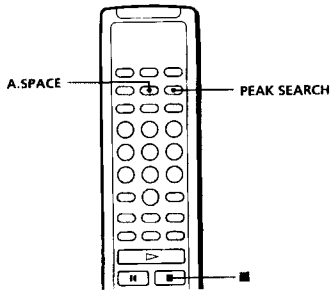
You can change discs during Time Fade
If the play ends before the specified fade-out time, (for example, when you record CD-singles on a tape) change the disc. The specified fade-out time is counted only during playing.

You can fade in to resume playing in Step 4
After you reverse the tape, press FADER.

Note
If you press ◀◀ or ▶▶ during Time Fade Play, Time Fade will be cancelled.

Useful Tips for Recording

Using these functions makes recording CDs more convenient.



Adjusting the Recording Level (Peak Search)

The player locates the highest level among the tracks to be recorded to let you adjust the recording level before you start recording.

1 Before you start playing, press PEAK SEARCH.
"PEAK" flashes in the display and the player repeats the portion of the highest level.

2 Adjust the recording level on the deck.

3 Press ■ on the player to stop Peak Search.
"PEAK" disappears from the display.

Note
The portion with the highest level may differ every time you try the adjustment on the same disc. The difference is, however, so slight that you won't find any problem in adjusting the recording level precisely.

Locating each track on a tape using the AMS function (Auto Space)

The Auto Space function inserts a blank space of 3 seconds between each track while playing, and enables you to locate each track using the AMS function of the deck.

Before you start playing, press A.SPACE.
"AUTO SPACE" appears in the display.

To cancel Auto Space
Press A.SPACE until "AUTO SPACE" disappears from the display.

Note
If you use the Auto Space function when recording, for example, a medley or symphony, the sound may be interrupted where the track number changes. It happens when the track numbers are assigned in the middle of the piece.

Storing Information About CDs (Custom Files)

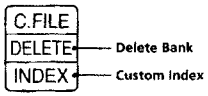
What You Can Do With the Custom Files

The player can store 2 types of information called "Custom Files" for each disc. Once you have stored Custom Files for a disc, the player automatically recalls what you have stored whenever you insert the disc. Note that Custom Files will be erased if you don't use the player for about 1 month.

You can store this information:

When you use	You can
Custom Index (page 22)	Index the disc at up to 8 points (for a disc with 32 tracks or less) or 5 points (for a disc with over 32 tracks)
Delete Bank (page 24)	Delete unwanted tracks and store only the tracks you want

The Custom File indication lights up when you store the corresponding information.



When you store a Custom File for a disc, the player remembers how you played that disc last time even if you removed the disc from the player (last mode memory). When you insert the same disc again, therefore, the player plays in the same play mode. The player also remembers the duration of fade in/out time if you've changed the time.
Note that when you press ⏏ to close the disc tray and start playing, the player plays in the play mode currently selected instead of the stored one.

Where are Custom Files stored?

Custom Files are stored not on the disc but in the player's memory. This means you cannot use Custom Files when you play the disc on other players.

How many discs can you file?

You can file up to 224 discs in the Custom File.
The player counts a disc as one even when you store the Custom Index and Delete Bank at the same time.

You can check how many discs you can file

1 Remove the disc from the player.
2 Press ⏏ OPEN/CLOSE to close the disc tray.
3 Press TIME while the music calendar disappears from the display.
The number of the Custom Files you can file appears.

If "FULL" appears in the display

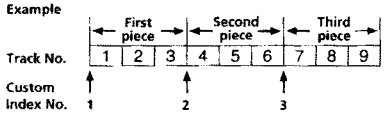
If the memory for Custom Files becomes full, the player displays "FULL" when you press FILE to store the information and you cannot store any more disc information. If necessary, erase any unwanted Custom Files (see pages 24 and 25).

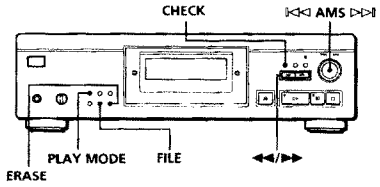
To erase all Custom Files of all discs
While holding down ERASE and FILE, press POWER to turn on the player. "FILE CLr" appears in the display and all the custom files will be erased.

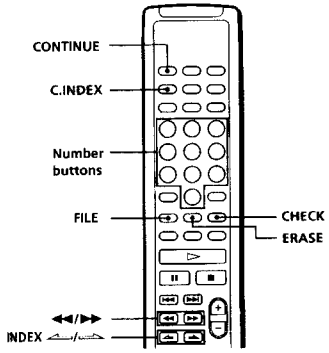
Indexing a Disc (Custom Index)

You can index a disc at up to 8 points (for a disc with 32 tracks or less) or 5 point (for a disc with over 32 tracks) so that you can easily locate a desired point. This might be useful when you play discs of symphonies or concertos that divide one piece into several tracks (see the example below).

Example







1 Insert the disc.

2 Press PLAY MODE repeatedly until "CUSTOM INDEX" appears in the display.
When using the remote, press C.INDEX.
The music calendar disappears.

3 Press FILE at the point you want to index.
The Custom Index number flashes in the display.
The player repeats the portion for 3 seconds from the point to be indexed.

4 Press ◀◀ or ▶▶ to adjust the point so that the player can repeat from the exact point you want to index.
Pressing these buttons 7 times moves the point by about 1 second ahead or behind.

If you don't want to index at the point
Press CLEAR and search another point to be indexed.

5 Press FILE again to store the Custom Index.
"INDEX" in the Custom File indication lights up in the display.

6 To mark more Custom Indexes, repeat Steps 3 to 5.

When you've already decided where to index
You can directly mark an index without adjusting the point. When you find the point to be indexed, first press ⏸ to pause playing and press FILE to mark an index.

Playing from an indexed point (Custom Index Play)

1 Press PLAY MODE repeatedly until "CUSTOM INDEX" appears in the display.
When using the remote, press C.INDEX.

2 Locate the Custom Index you want as follows:

To locate	Press
The next Custom Index	INDEX ⇀
The current Custom Index	INDEX ↽
A specific Custom Index directly	Number button of the Custom Index

Playback starts from the selected Custom Index to the end of the disc.

To cancel the Custom Index Play
Press PLAY MODE twice (or CONTINUE on the remote).

Notes
- You cannot use the Index Search function (see page 12).
- Use INDEX ↽/⇀ buttons to locate the next or the current Custom Indexes, instead of ⏮/⏭ buttons on the remote.

Playing from one index to the next one (Custom Index Single Play)
1 Press PLAY MODE repeatedly until "CUSTOM INDEX (1)" appears in the display.
When using the remote, press C.INDEX.
2 Press the number button of the Custom Index you want on the remote.
Playback starts from the selected Custom Index and stops at the beginning of the next index.
To cancel the Custom Index Single Play, press PLAY MODE once (or CONTINUE on the remote).

You can play the portion between two indexes repeatedly
Press REPEAT.

Erasing the Custom Index

1 Insert the disc.

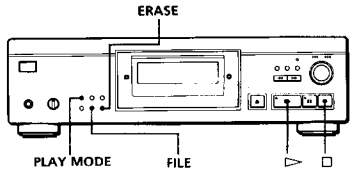
2 Press PLAY MODE repeatedly until "CUSTOM INDEX" appears in the display.
When using the remote, press C.INDEX.

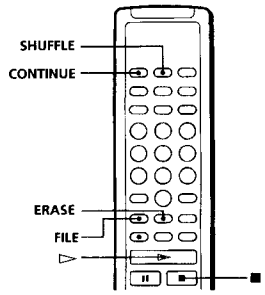
3 Press CHECK repeatedly until the Custom Index number you want to erase flashes.

4 Press ERASE while the number is flashing to erase the Custom Index.
The succeeding Custom Index numbers decrease by one.

Storing Specific Tracks of a Disc (Delete Bank)

You can delete unwanted tracks and store only the tracks you want. You can start playing your favourite tracks without deleting tracks each time.





1 Insert the disc.

2 Delete tracks you don't want.
Follow Steps 1 to 3 in "Playing Only Specific Tracks" on page 16.

3 Press FILE to store the remaining tracks.
"DELETE" in the Custom File indication lights up in the display.

Playing using the Delete Bank

1 Press PLAY MODE repeatedly until "SHUFFLE," "PROGRAM" and "CUSTOM INDEX" disappear from the display.
When using the remote, press CONTINUE.
The Delete Bank is recalled and the selected track numbers appear on the music calendar.

2 Press ▷ to start playing.

To cancel playing using the Delete Bank
Press □.

To start playing using the Delete Bank again
While "PROGRAM" or "CUSTOM INDEX" appears in the display, press PLAY MODE repeatedly until these indications disappear from the display or until "SHUFFLE" appears in the display. The Delete Bank is recalled and you can start playing by pressing ▷.

You can play in a random order using the Delete Bank
In Step 1, press PLAY MODE repeatedly until "SHUFFLE" appears in the display (or press SHUFFLE on the remote).

Erasing the Delete Bank

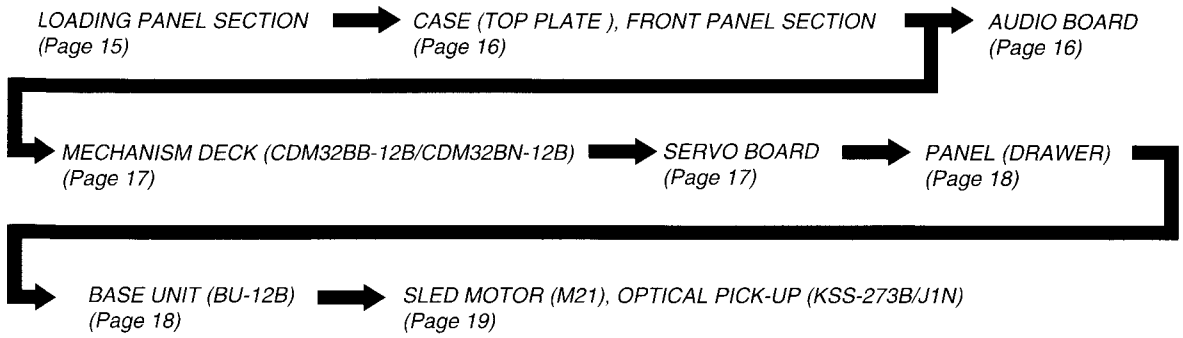
1 Insert the disc.

2 Press PLAY MODE repeatedly until "PROGRAM" and "CUSTOM INDEX" disappear from the display.
When using the remote, press CONTINUE or SHUFFLE.
The display shows the stored Delete Bank.

3 Press ERASE to erase the Delete Bank.
"DELETE" in the Custom File indication disappears.

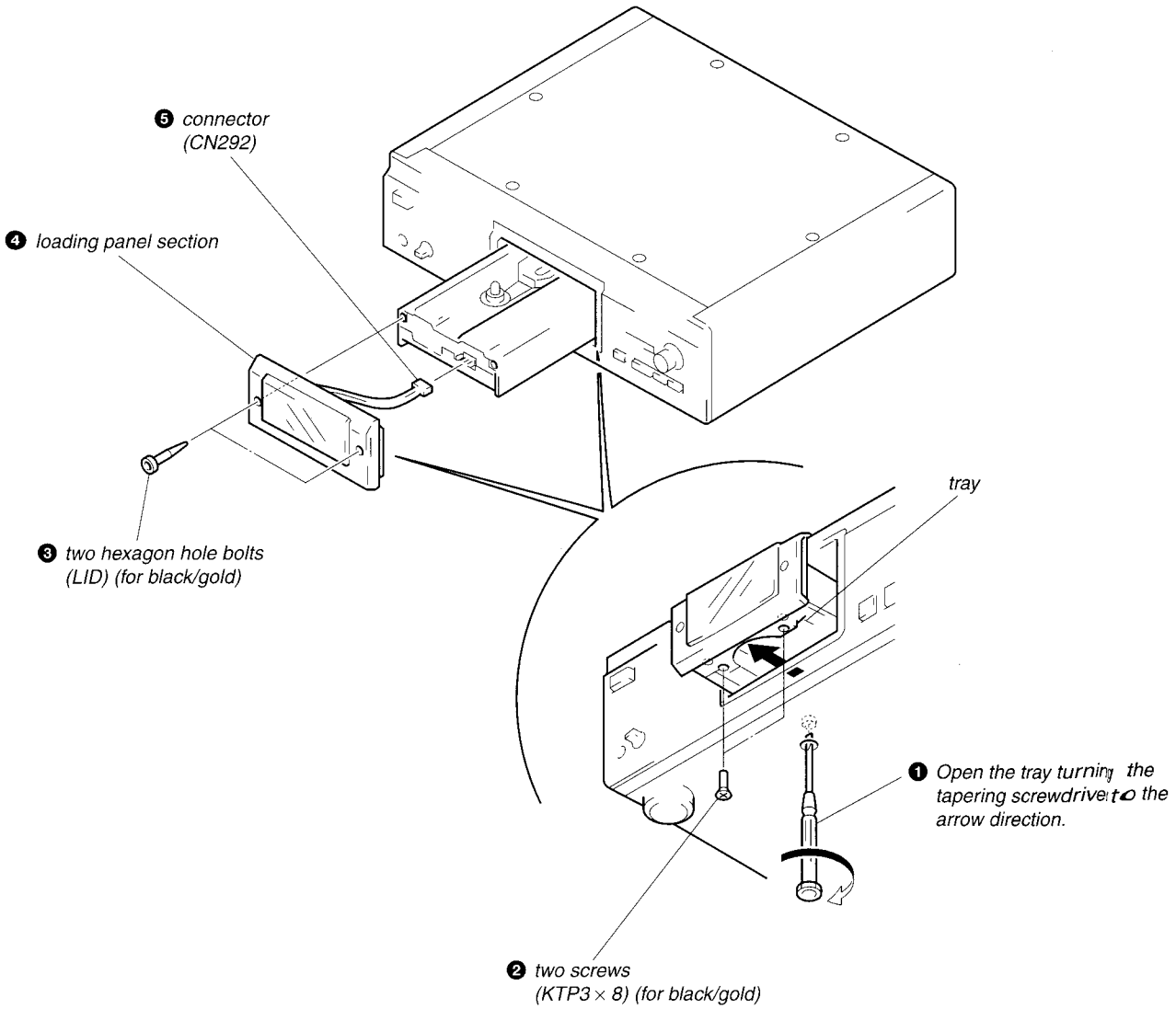
SECTION 3
DISASSEMBLY

• This set can be disassembled in the order shown below.

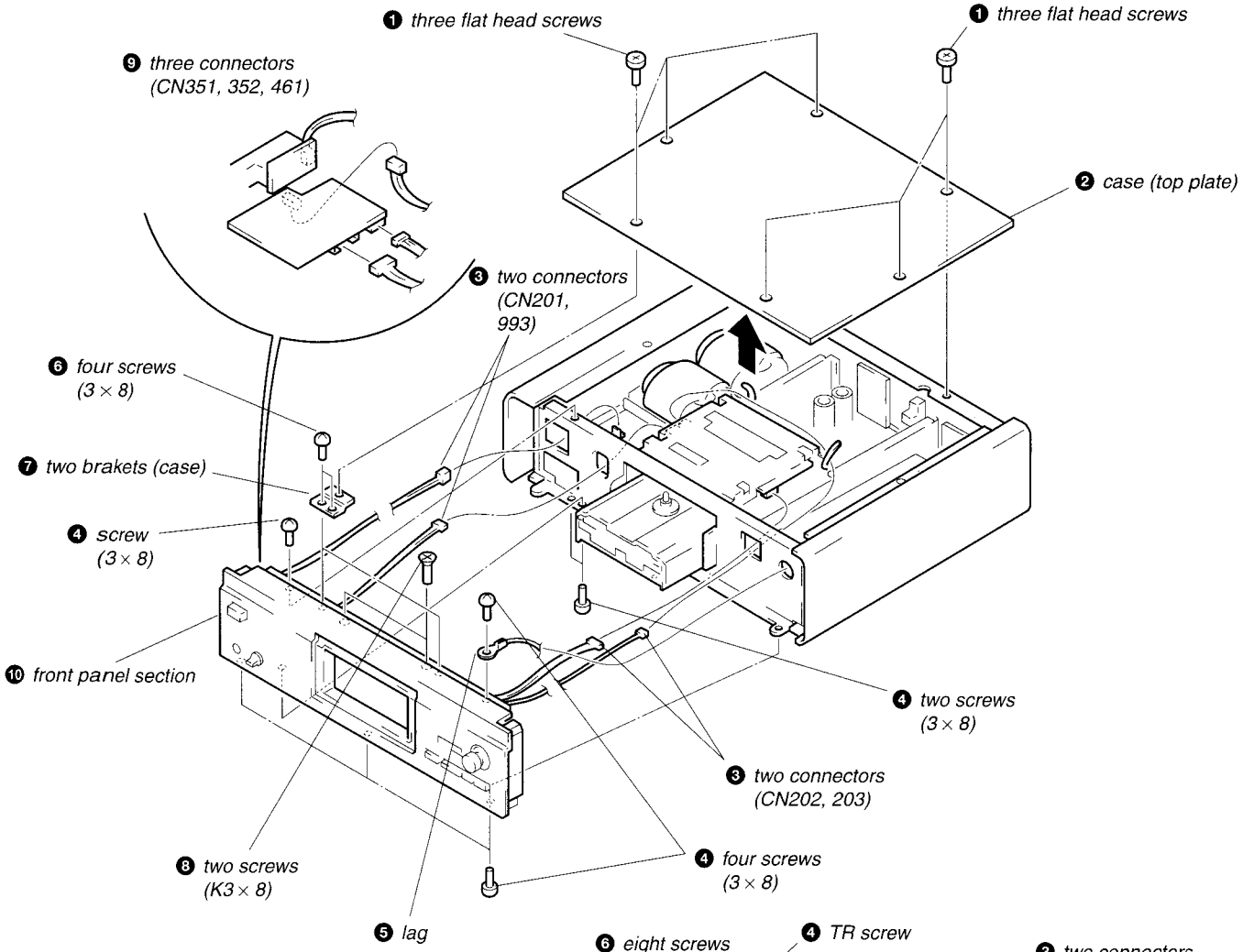


Note: Follow the disassembly procedure in the numerical order given.

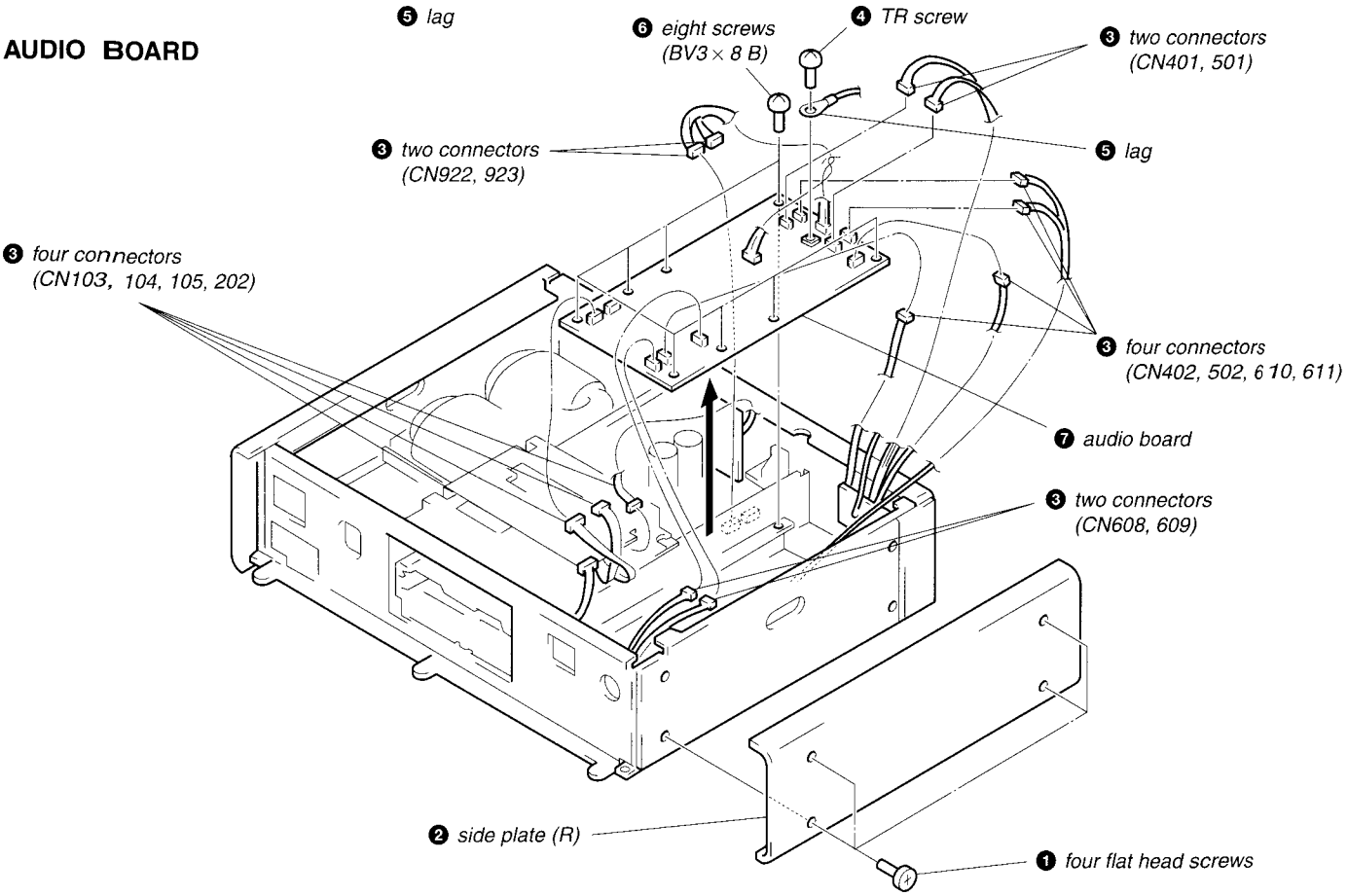
LOADING PANEL SECTION


❺ connector
(CN292)
❹ loading panel section
❸ two hexagon hole bolts
(LID) (for black/gold)
tray
❶ Open the tray turning the tapering screwdriver to the arrow direction.
❷ two screws
(KTP3 × 8) (for black/gold)

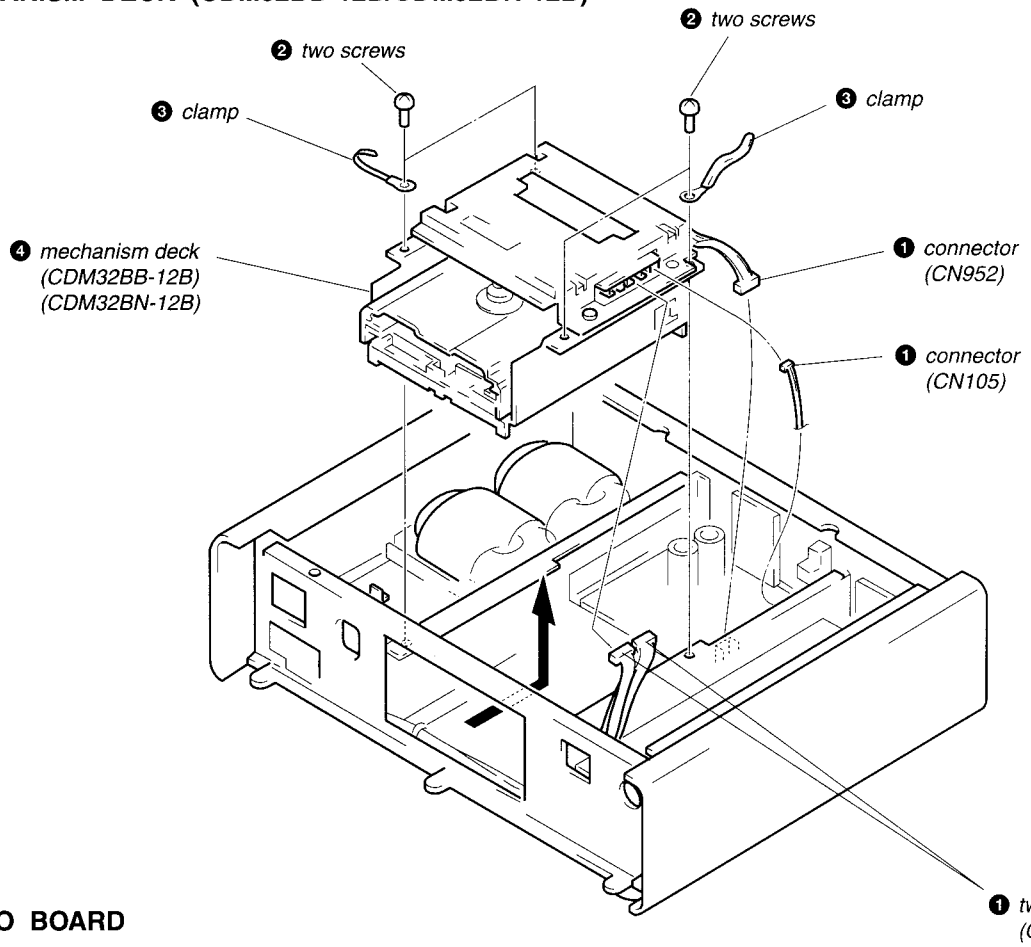
CASE (TOP PLATE), FRONT PANEL SECTION


❶ three flat head screws
❶ three flat head screws
❾ three connectors (CN351, 352, 461)
❷ case (top plate)
❸ two connectors (CN201, 993)
❻ four screws (3 × 8)
❼ two brakets (case)
❹ screw (3 × 8)
❿ front panel section
❹ two screws (3 × 8)
❸ two connectors (CN202, 203)
❽ two screws (K3 × 8)
❹ four screws (3 × 8)
❺ lag

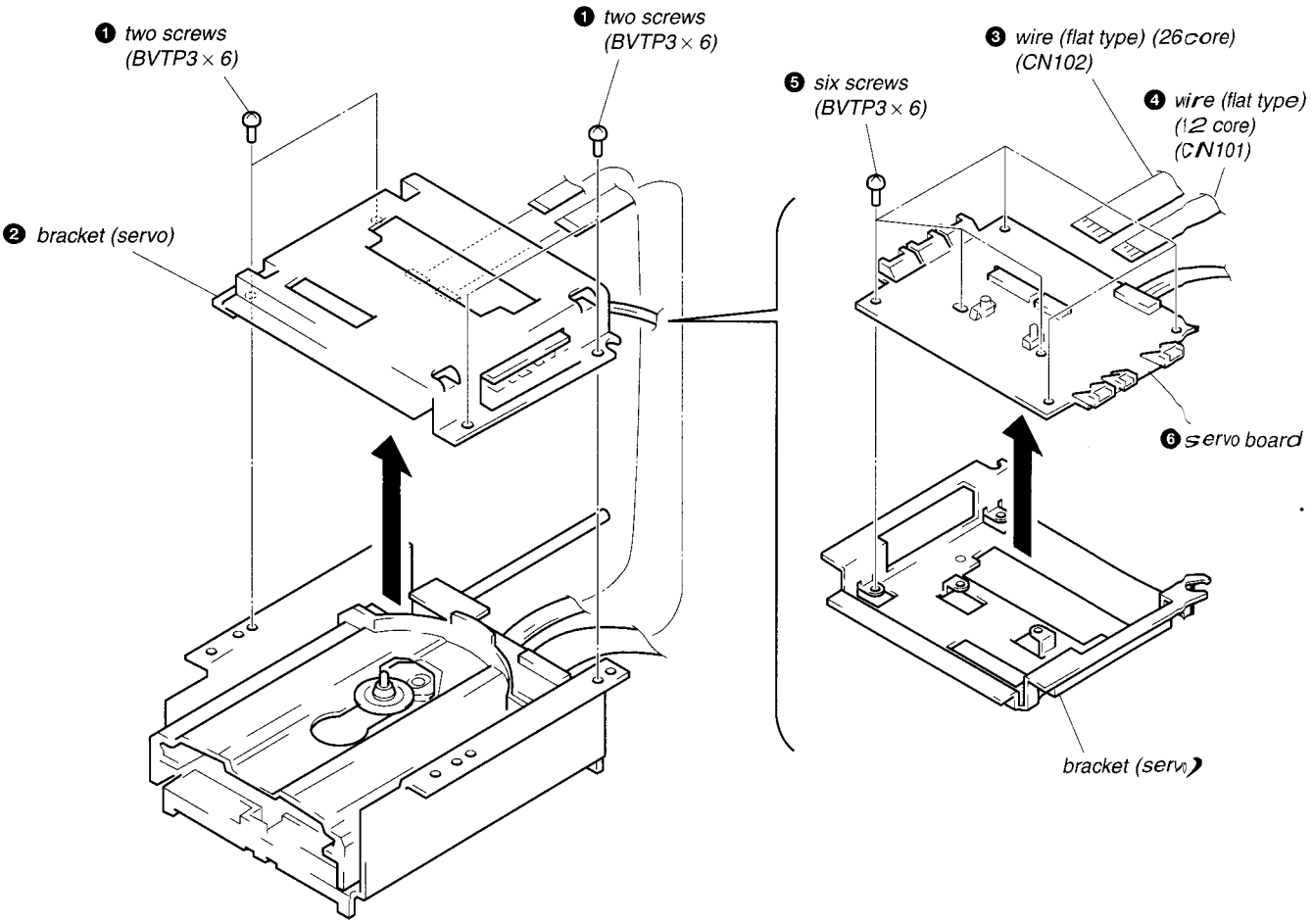
AUDIO BOARD


❻ eight screws (BV3 × 8 B)
❹ TR screw
❸ two connectors (CN401, 501)
❸ two connectors (CN922, 923)
❺ lag
❸ four connectors (CN103, 104, 105, 202)
❸ four connectors (CN402, 502, 610, 611)
❼ audio board
❸ two connectors (CN608, 609)
❷ side plate (R)
❶ four flat head screws

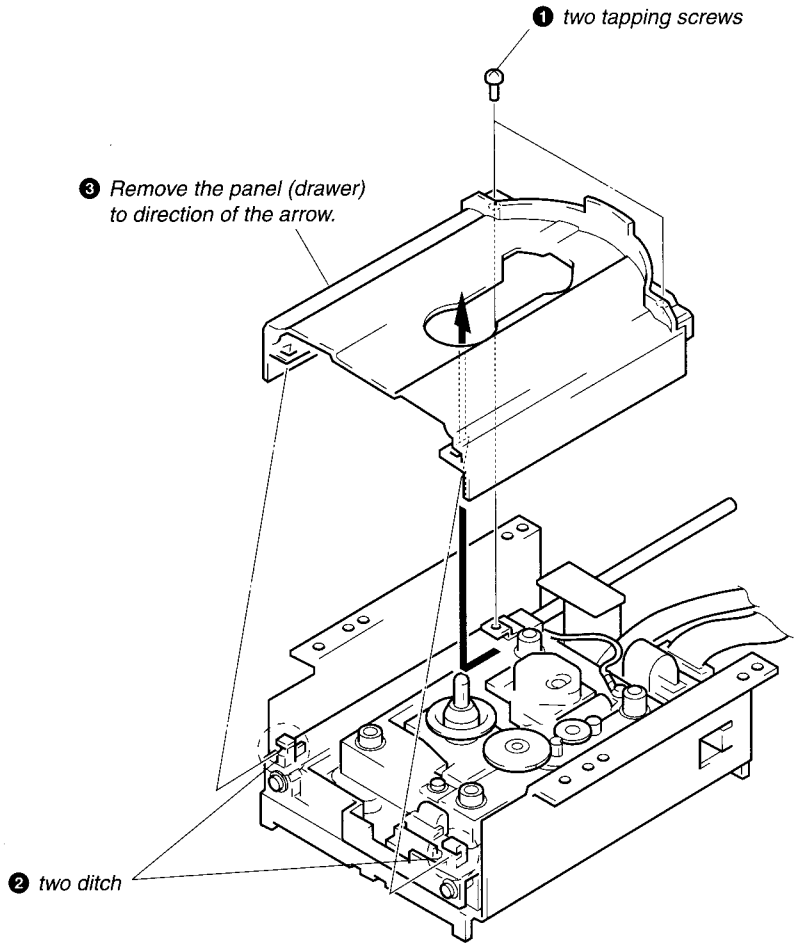
MECHANISM DECK (CDM32BB-12B/CDM32BN-12B)



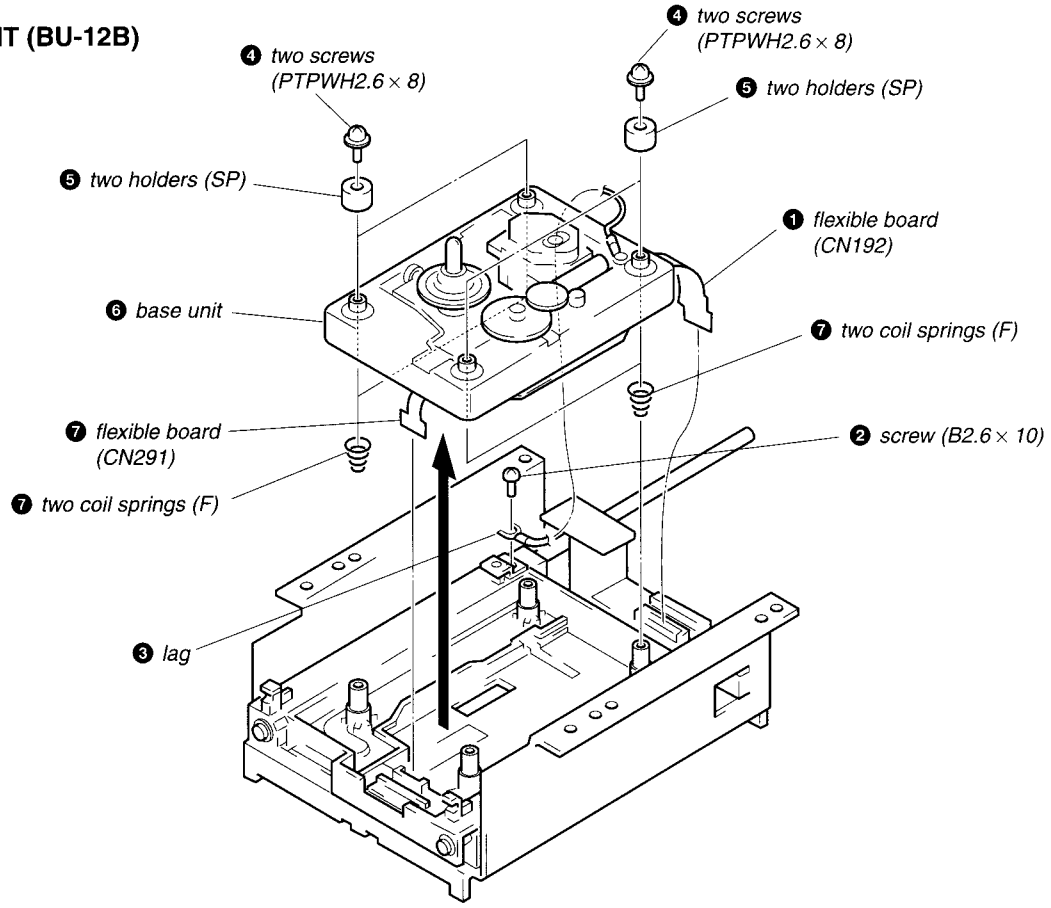
SERVO BOARD


❶ two screws (BVTP3 × 6)
❶ two screws (BVTP3 × 6)
❷ bracket (servo)
❸ wire (flat type) (26 core) (CN102)
❺ six screws (BVTP3 × 6)
❹ wire (flat type) (12 core) (CN101)
❻ servo board
bracket (servo)

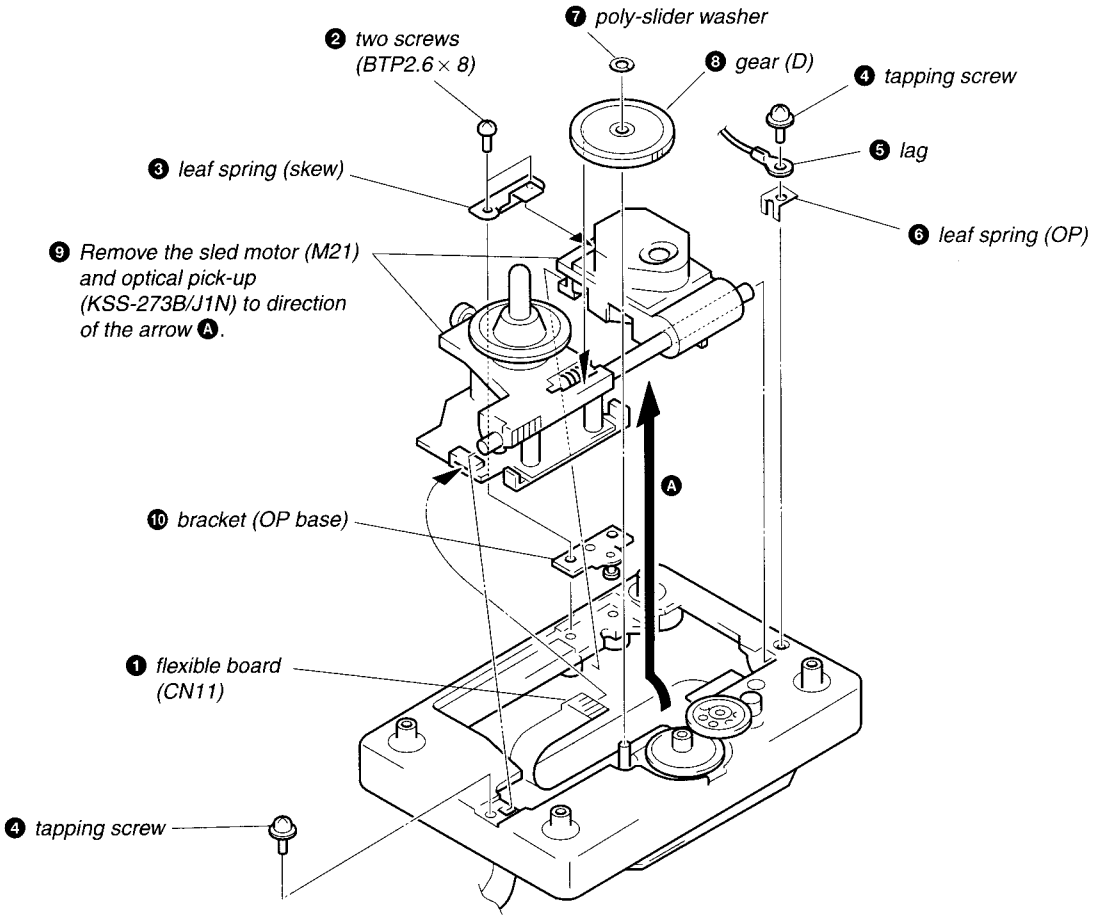
PANEL (DRAWER)



BASE UNIT (BU-12B)


❹ two screws (PTPWH2.6 × 8)
❹ two screws (PTPWH2.6 × 8)
❺ two holders (SP)
❺ two holders (SP)
❶ flexible board (CN192)
❻ base unit
❼ two coil springs (F)
❼ flexible board (CN291)
❷ screw (B2.6 × 10)
❼ two coil springs (F)
❸ lag

SLED MOTOR (M21), OPTICAL PICK-UP (KSS-273B/J1N)


❼ poly-slider washer
❷ two screws (BTP2.6 × 8)
❽ gear (D)
❹ tapping screw
❺ lag
❸ leaf spring (skew)
❻ leaf spring (OP)
❾ Remove the sled motor (M21) and optical pick-up (KSS-273B/J1N) to direction of the arrow Ⓐ.
Ⓐ
❿ bracket (OP base)
❶ flexible board (CN11)
❹ tapping screw

SECTION 4
TEST MODE

4-1. AF MODE

Connect the TP2 (AFJ) on the SERVO board to the ground and turn on the power supply.
The AF mode is then activated and the following check can be made.

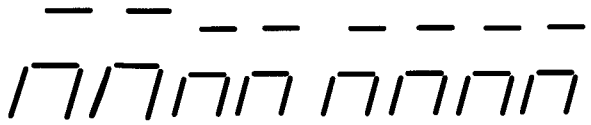
4-1-1. Fluorescent Indicator Tube Check

After confirming display of all on, keep pressing the following button, and the following display is attained.

■ (STOP) button

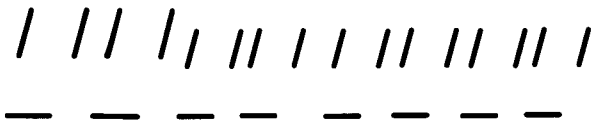
(Display: 01)

(PLAY) button



(Display: 02)

❚❚ (PAUSE) button



(Display: 03)

▶▶ button

SHUFFLE REPEAT A-
AUTO SPACE EDIT

STEP *(Display: 04)*

◀◀ button

1 B (JUST)
PROGRAM

INDEX PEAK *(Display: 05)*

CHECK button

1		3		5
	7		9	
11		13		15

(Display: 06)

CLEAR button

2 4
6 8 10
12 14

(Display: 07)

P MODE button

SIDE-A CUSTOM INDEX
FADE
C. SEC
DELETE

(Display: 08)

REPEAT button

SIDE-B (TIME) (1)
MIN C. FILE
INDEX
•

(Display: 09)

TIME button

(Display: 10)

Keep pressing the ⏏OPEN/CLOSE button, and all on display is attained again.

4-1-2. Key Check

All buttons are assigned with numbers respectively, and when each button is pressed, it is counted and its number is displayed. Up to "16" can be counted.
A button pressed once is not further counted but the number is displayed.

Table 4-1.

Button	Display	Button	Display
ERASE	00	❚❚	03
EDIT/ TIME FADE	12	▶▶	04
FILE	13	◀◀	05
FILTER	20	CHECK	06
PUSH ENTER	23	CLEAR	07
⏏ OPEN/CLOSE	all light up	P MODE	08
■	01	REPEAT	09
▶	02	TIME	10

4-1-3. Remote Commander Check

Press the ▶ button on remote commander, and " ° " ▶ on the set turn on. Nothing will be displayed if pressing another button.

4-2. ADJ MODE

Connect the TP1 (ADJ) on the SERVO board to the TP (GND) and turn on the power supply. The ADJ mode is then activated and the following operation is executed.

- There is no problem even if GFS is low value continuously during playing.
- Do not perform high speed search during an access.
- The gain of focus servo and spindle servo does not lower during playing.
- Manual operation and measurement of the servo system are possible. (For detailed operating method, see Table 4-2. in ADJ Mode.)

4-2-1. Button Operation Table in ADJ Mode

After all music numbers are displayed, press the TIME button, and the jitter display mode is then set. The button functions are as listed below.

Button Functions (Operate with remote commander.)

Table 4-2.

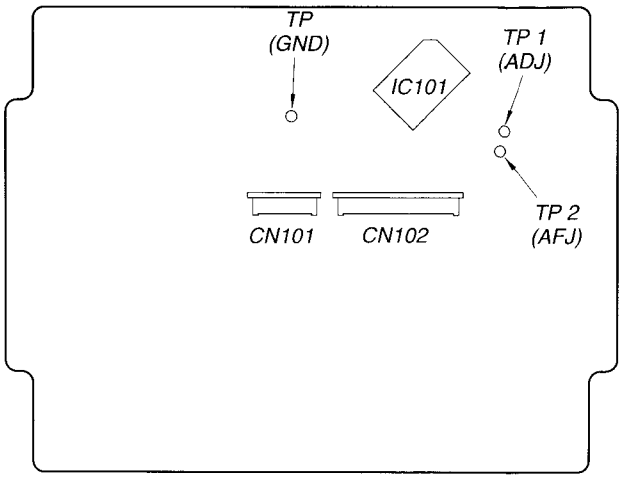
Button No.	Test Mode
3	Tracking servo off
8	Tracking servo on
11	S-curve measuring mode
12	All servo off
13	Top turnback display
14	Botton turnback display
15	Center display
16	Optimum point display
17	Optimum jitter display
18	TE traverse display
19	VC, FE and RF display
20	Autogain display (Focus, tracking and sled)

* For button numbers 3, 8, 11, and 12, use them only when an oscilloscope is connected.

4-3. CLV-S MODE

The spindle servo can be operated for play in the CLV-S mode by connecting TP (ADJ) and TP (GND) after turning on the power supply.

[SERVO BOARD] – Conductor side –



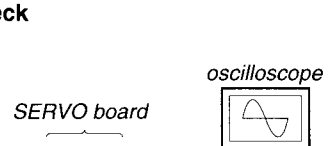
SECTION 5
ELECTRICAL ADJUSTMENTS

Notes:

1. CD block basically constructed to operate without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (Part No.: 3-702-101-01) unless otherwise indicated.
3. Use the oscilloscope with more than 10 MΩ impedance.
4. Clean an object lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.

S-Curve Check

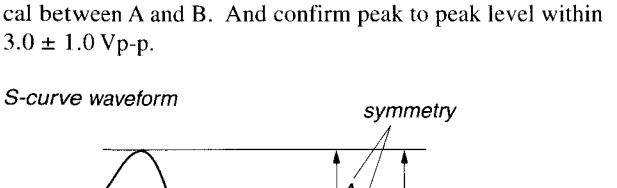
Connection:



Procedure:

1. Connect the oscilloscope to TP (FE) and TP (VC) on SERVO board.
2. Connect the TP (FEI: IC101 pin ㉙) and TP (VC) with lead wire.
3. Turned power switch on.
4. Put disc (YEDS-18) in and turned power switch on again and actuate the focus search. (actuate the focus search when disc table is moving in and out.)
5. Confirm that the oscilloscope waveform (S-curve) is symmetrical between A and B. And confirm peak to peak level within 3.0 ± 1.0 Vp-p.

S-curve waveform

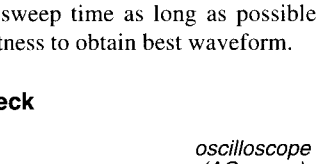


6. After check, remove the lead wire connected in step 2.

Note: • Try to measure several times to make sure that the ratio of A : B or B : A is more than 10 : 7.
• Take sweep time as long as possible and light up the brightness to obtain best waveform.

RF Level Check

Connection:

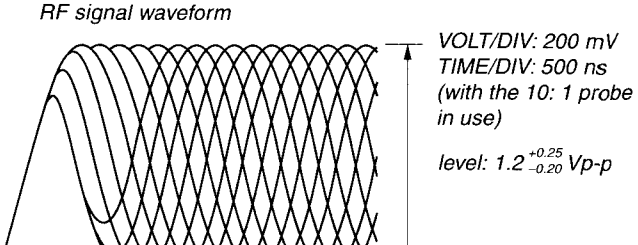


Procedure:

1. Connect the oscilloscope to TP (RF) and TP (VC) on SERVO board.
2. Turned power switch on. (stop mode)
3. Put disc (YEDS-18) in and press the ▶ button.
4. Confirm that the oscilloscope waveform is clear and check RF signal level is correct or not.

Note: Clear RF signal waveform means that the shape "◇" can be clearly distinguished at the center of the waveform.

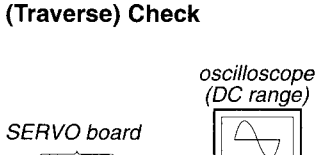
RF signal waveform



When observing the eye pattern, set the oscilloscope for AC range and raise vertical sensitivity.

E-F Balance (Traverse) Check

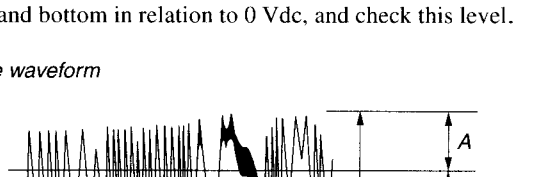
Connection:



Procedure:

1. Connect the TP1 (ADJ) to ground and TP (TEI: IC101 pin ㉗) to TP (VC) with lead wire.
2. Connect the oscilloscope to TP (TE) and TP (VC) on SERVO board.
3. Turned power switch on.
4. Put disc (YEDS-18) in and press the ▶ button.
5. Confirm that the oscilloscope waveform is symmetrical on the top and bottom in relation to 0 Vdc, and check this level.

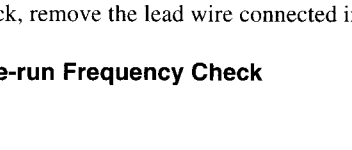
Traverse waveform



6. After check, remove the lead wire connected in step 1.

RF PLL Free-run Frequency Check

Connection:

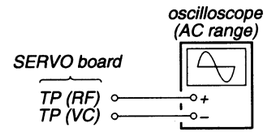


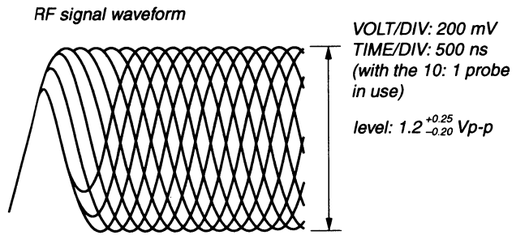
Procedure:

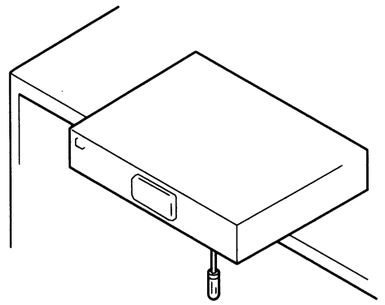
1. Connect the frquency counter to TP (PLK).
2. Turned power switch on.
3. Put disc (YEDS-18) in and press the ▶ button.
4. Confirm that the reading on frequency counter is 4.3218 MHz.

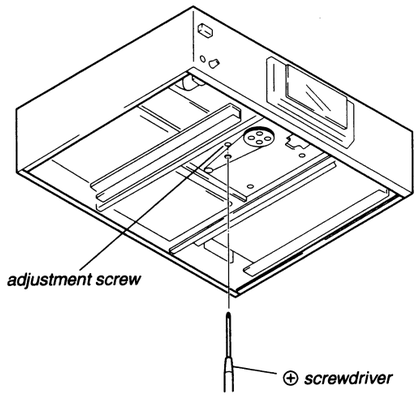
Skew Adjustment

Note : Do not perform the skew adjustment when not using attached stabilizer to a set.







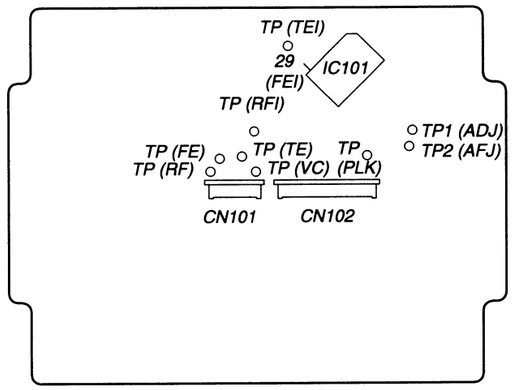


1. Remove the bottom plate, put one third of the unit out from the desk.
2. Connect the osiclloscope to TP (RF) and TP (VC) on SERVO board.
3. Turned power switch on.
4. Put disc (YEDS-18) in and press the ▶ button.
5. Adjust to be clear the waveform of the oscilloscope turning the adjsutment screw with a ⊕ screwdriver.

Note: Clear RF signal waveform means that the shap "◇"can be clearly distinguished at the center of the waveform.

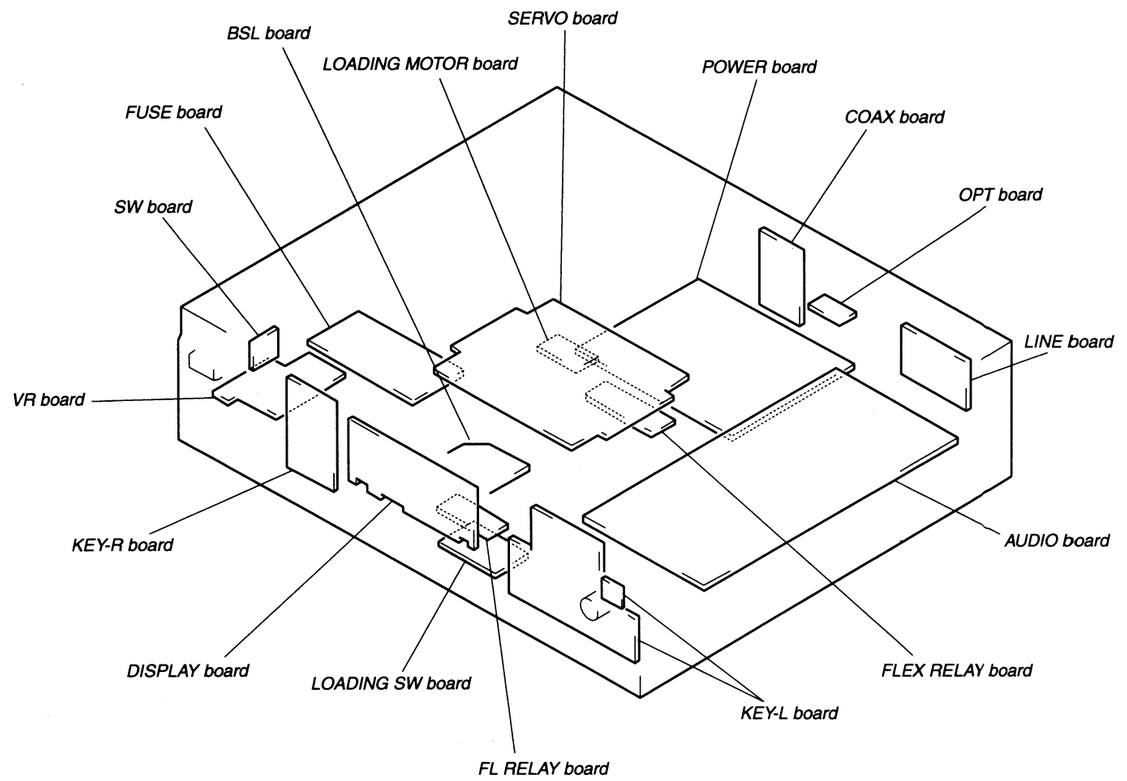
6. After the adjustment, lock the adjustment screw.

[SERVO BOARD] – Conductor side –

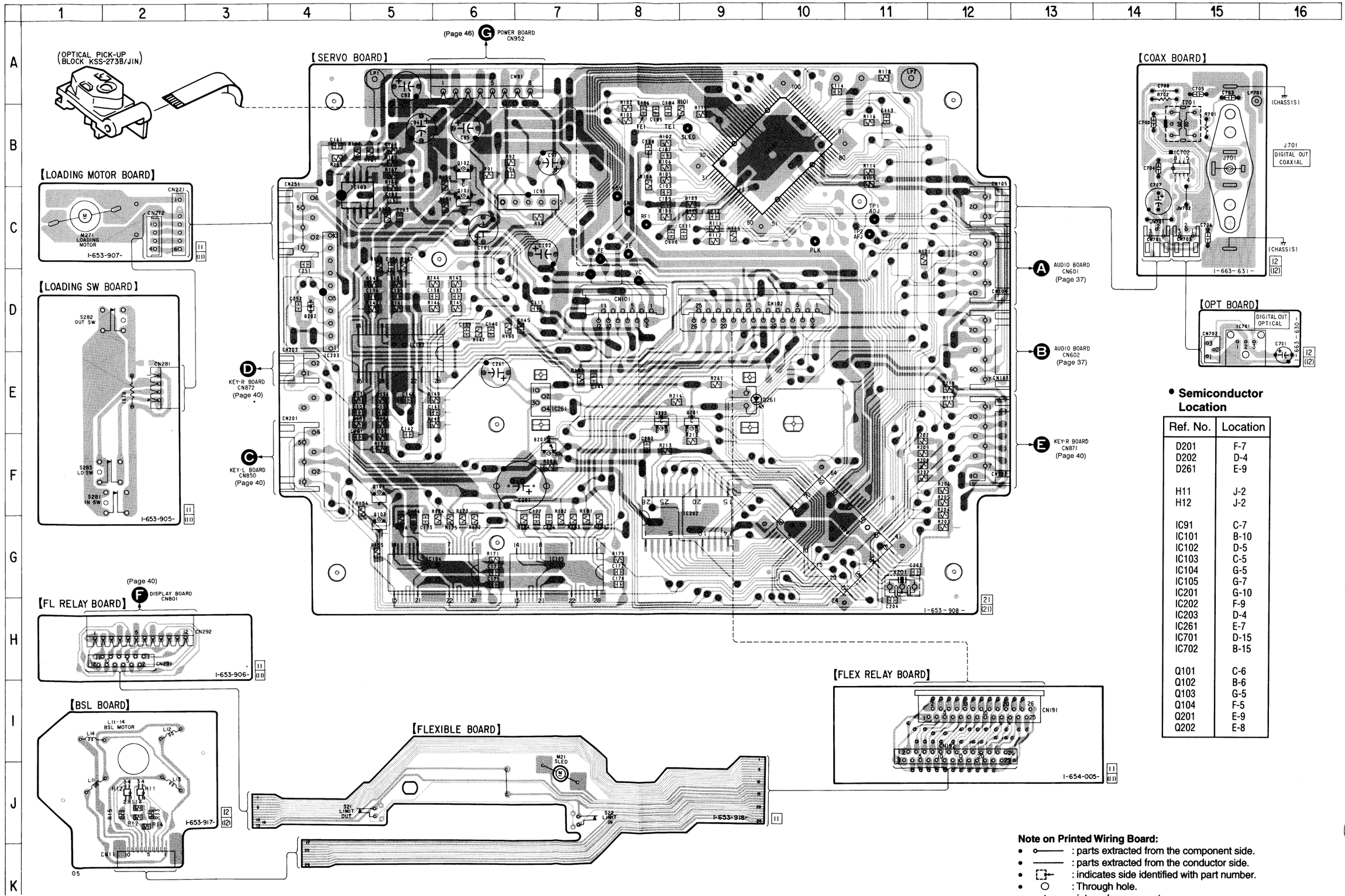


SECTION 6
DIAGRAMS

• Circuit Boards Location



6-1. PRINTED WIRING BOARDS – SERVO Section – • See page 24 for Circuit Boards Location.



• **Semiconductor Location**

Ref. No.	Location
D201	F-7
D202	D-4
D261	E-9
H11	J-2
H12	J-2
IC91	C-7
IC101	B-10
IC102	D-5
IC103	C-5
IC104	G-5
IC105	G-7
IC201	G-10
IC202	F-9
IC203	D-4
IC261	E-7
IC701	D-15
IC702	B-15
Q101	C-6
Q102	B-6
Q103	G-5
Q104	F-5
Q201	E-9
Q202	E-8

Note on Printed Wiring Board:

- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : indicates side identified with part number.
- : Through hole.
- : internal component.
- : Pattern of the rear side.
- : Pattern from the side which enables seeing.

6-2. SCHEMATIC DIAGRAM – SERVO Section –

• See page 49 for IC Block Diagrams, see page 53 for Waveforms, and see page 54 for IC Pin Function Description.

【SERVO BOARD】

【OPT BOARD】 IC701 OPTICAL DIGITAL OUT

【COAX BOARD】 IC702 WAVEFORM SHAPER

【LOADING SW BOARD】

【LOADING MOTOR BOARD】

【FL RELAY BOARD】

【FLEXIBLE BOARD】

【BSL BOARD】

FLEX RELAY BOARD

IC203 LOADING MOTOR DRIVE

IC261 STABILIZER DETECT SENSOR

IC202 S-RAM

IC201 SYSTEM CONTROLLER

Q201, 202 +5V SWITCH

⚠ OPTICAL PICK-UP (KSS-273B/J1N)

(Page 32) (Page 32)

A AUDIO BOARD CN601

B AUDIO BOARD CN602

IC203
LOADING MOTOR DRIVE

IC203 LB1641

IC201
SYSTEM CONTROLLER

IC201 CXP84124-068Q

IC202 LC35645M-10-TRM

IC101
DIGITAL SIGNAL PROCESSOR, FOCUS/TRACKING/SLED SERVO, EFM COMPARATOR

IC101 CXD2545Q

IC104
SPINDLE MOTOR DRIVE

IC102 BA6297AFP-T1

IC103 (1/2) NJM4558

IC103 (2/2) NJM4558

IC104 BA6297AFP-T1

IC105 BA6297AFP-T1

Q201, 202 +5V SWITCH

X201 4MHz

CN105 3P GND +5V BOUT

CN104 6P BRST AMUTE BMUTE ATT SHIFT LATCH

CN103 7P XRST XTAL +5V GND BCLK DATA LRCK

CN101 12P VC TE FE LDVCC RFO GND VCC LDON F+ T+ T- F-

CN201 6P K0 K1 GND +5V UP DOWN

CN203 2P ON K1

CN202 8P PLAY PAUSE K2 K3 K4 K5 GND +5V

CN102B 26P SD+ SD- GND LMTOUT +5V LMTIN

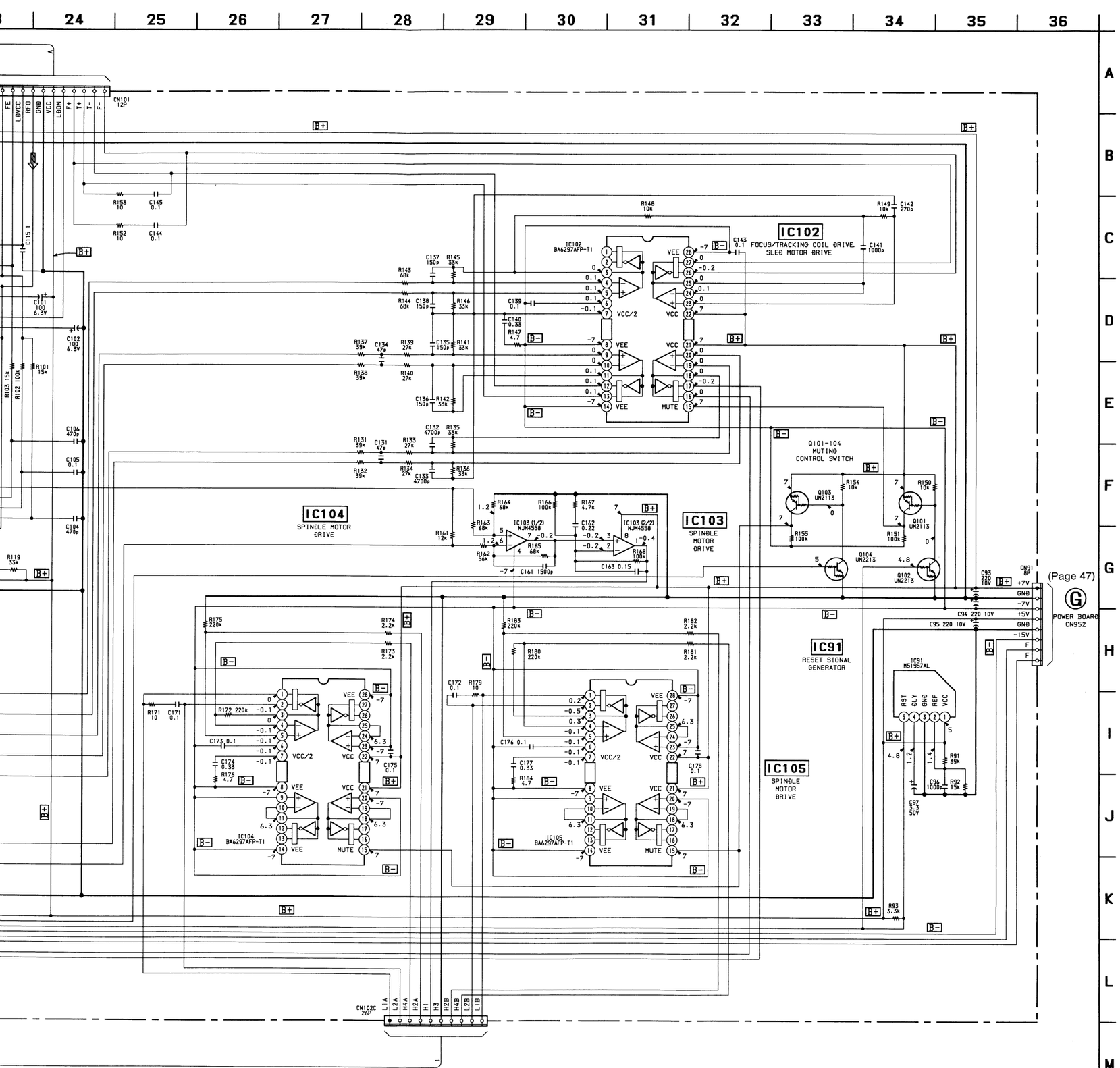
CN102C 26P L1A L2A H4A H2A H1 H3 H2B H4B L2B L1B

C KEY-L BOARD CN850

D KEY-R BOARD CN872

E KEY-R BOARD CN871

(Page 41) (Page 41) (Page 41)


23 24 25 26 27 28 29 30 31 32 33 34 35 36
A B C D E F G H I J K L M
CN101 12P
FE LDVCC RFO GND VCC LDON F+ T+ T- F-
IC102 FOCUS/TRACKING COIL DRIVE, SLED MOTOR DRIVE
IC104 SPINDLE MOTOR DRIVE
IC103 SPINDLE MOTOR DRIVE
IC105 SPINDLE MOTOR DRIVE
IC91 RESET SIGNAL GENERATOR
Q101-104 MUTING CONTROL SWITCH
IC102 BA6297AFP-T1
IC103 (1/2) NJM4558
IC103 (2/2) NJM4558
IC104 BA6297AFP-T1
IC105 BA6297AFP-T1
IC91 MSI957AL
VCC/2
VEE
VCC
MUTE
CN102C 26P
L1A L2A H4A H2A H1 H3 H2B H4B L2B L1B
CN91 8P
+7V GND -7V +5V GND -15V F F
(Page 47)
Ⓖ
POWER BOARD CN952

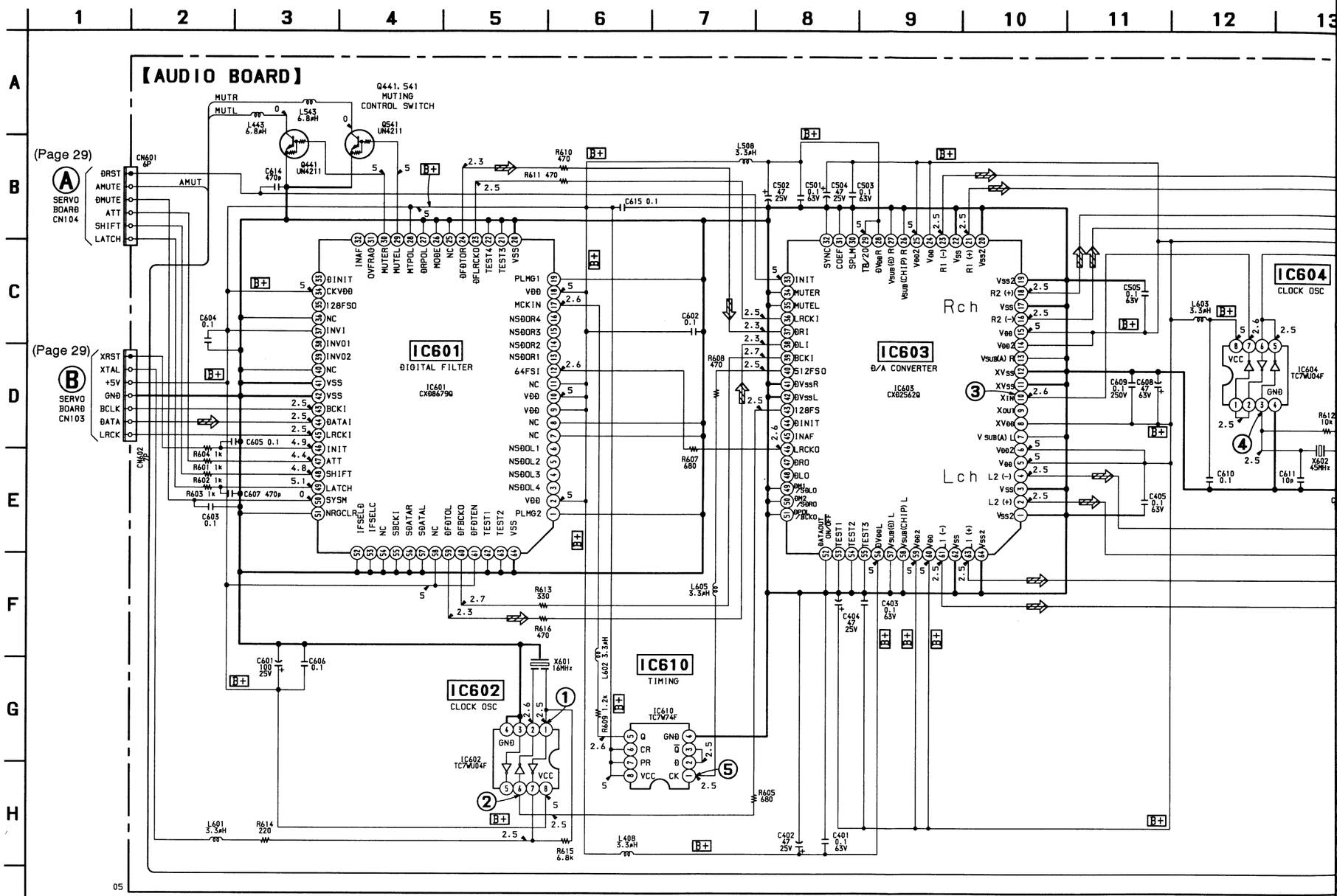
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- △ : internal component.
- ▭ : panel designation.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

- B+ : B+ Line.
- B− : B− Line.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark : CD PLAY
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇒ : CD
  ⇒ : digital out

6-3. SCHEMATIC DIAGRAM – AUDIO Section – • See page 51 for IC Block Diagrams, see page 53 for Waveforms.



Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- ⏦ : fusible resistor.
- ▭ : panel designation.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

- B+ : B+ Line.
- B− : B− Line.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark : CD PLAY
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : CD

e 51 for IC Block Diagrams, see page 53 for Waveforms.

5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23

IC603
Ø/A CONVERTER
IC603 CX025620

IC604
CLOCK OSC
IC604 TC7MU04F
X602 45MHz

IC605
+5V REGULATOR
IC605 MSF7805L

IC607
+7V REGULATOR
IC607 MSF7807L

IC609
+5V REGULATOR
IC609 NJM78L05

IC608
-7V REGULATOR
IC608 MSF7907L

IC610
TIMING
IC610 TC7W74F
X601 16MHz

IC504
CURRENT PULSE Ø/A CONVERTER
IC504 CXA8042AS

IC404
CURRENT PULSE Ø/A CONVERTER
IC404 CXA8042AS

IC501
I-V CONVERSION
IC501 (1/2) OPA2604AP
IC501 (2/2) OPA2604AP

IC502
MIX AMP
IC502 (2/2) OPA2132PA

IC402
(2/2) MIX AMP
IC402 (2/2) OPA2132PA

IC401
I-V CONVERSION
IC401 (1/2) OPA2604AP
IC401 (2/2) OPA2604AP

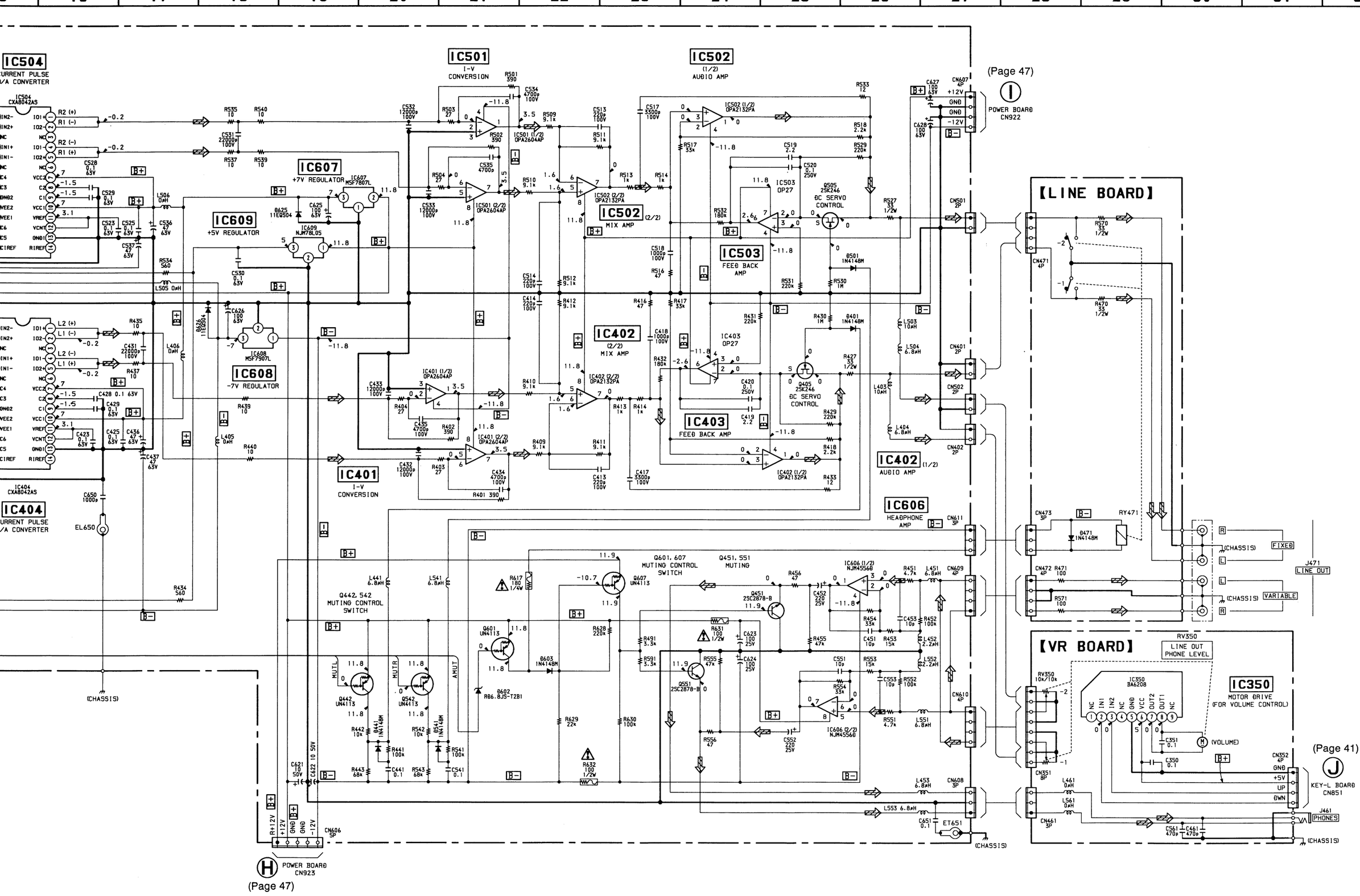
Rch
Lch

Q442, 542
MUTING CONTROL SWITCH

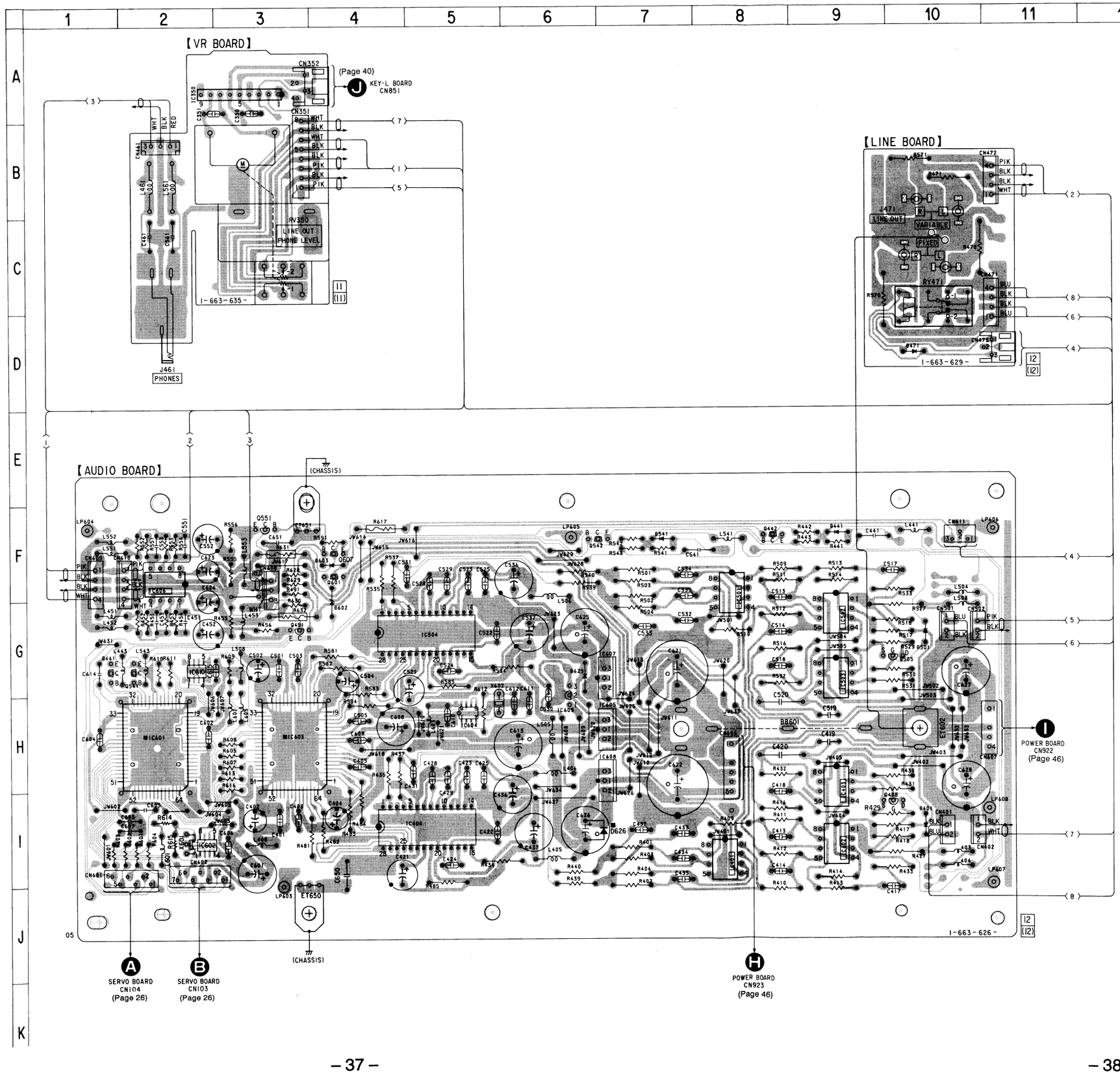
(CHASSIS)

H POWER BOARD CN923

(Page 47)


IC504
CURRENT PULSE D/A CONVERTER
IC501
I-V CONVERSION
IC502
(1/2) AUDIO AMP
IC607
+7V REGULATOR
IC609
+5V REGULATOR
IC608
-7V REGULATOR
IC401
I-V CONVERSION
IC402
(2/2) MIX AMP
IC402
(1/2) AUDIO AMP
IC403
FEED BACK AMP
IC503
FEED BACK AMP
IC606
HEADPHONE AMP
IC404
CURRENT PULSE D/A CONVERTER
Q601, 607 MUTING CONTROL SWITCH
Q451, 551 MUTING
Q442, 542 MUTING CONTROL SWITCH
(Page 47)
POWER BOARD CN922
POWER BOARD CN923
(Page 47)
【LINE BOARD】
【VR BOARD】
IC350
MOTOR DRIVE (FOR VOLUME CONTROL)
LINE OUT PHONE LEVEL
RV350
(Page 41)
KEY-L BOARD CN851
(CHASSIS)
FIXED
VARIABLE
J471 LINE OUT
J461 PHONES

6-4. PRINTED WIRING BOARDS – AUDIO Section – • See page 24 for Circuit Boards Location.



• **Semiconductor Location**

Ref. No.	Location
D401	I-10
D441	F-9
D471	D-10
D501	G-10
D541	F-7
D602	G-4
D603	F-4
D625	G-6
D626	I-7
IC350	A-2
IC401	I-8
IC402	I-9
IC403	I-9
IC404	I-5
IC501	F-8
IC502	G-9
IC503	G-9
IC504	G-5
IC601	H-2
IC602	I-2
IC603	H-3
IC604	H-5
IC605	H-7
IC606	F-2
IC607	G-7
IC608	H-7
IC609	H-6
IC610	G-2
Q405	I-10
Q441	G-1
Q442	F-8
Q451	G-3
Q505	G-10
Q541	G-2
Q542	F-6
Q551	F-3
Q601	F-4
Q607	F-4

Note on Printed Wiring Board:

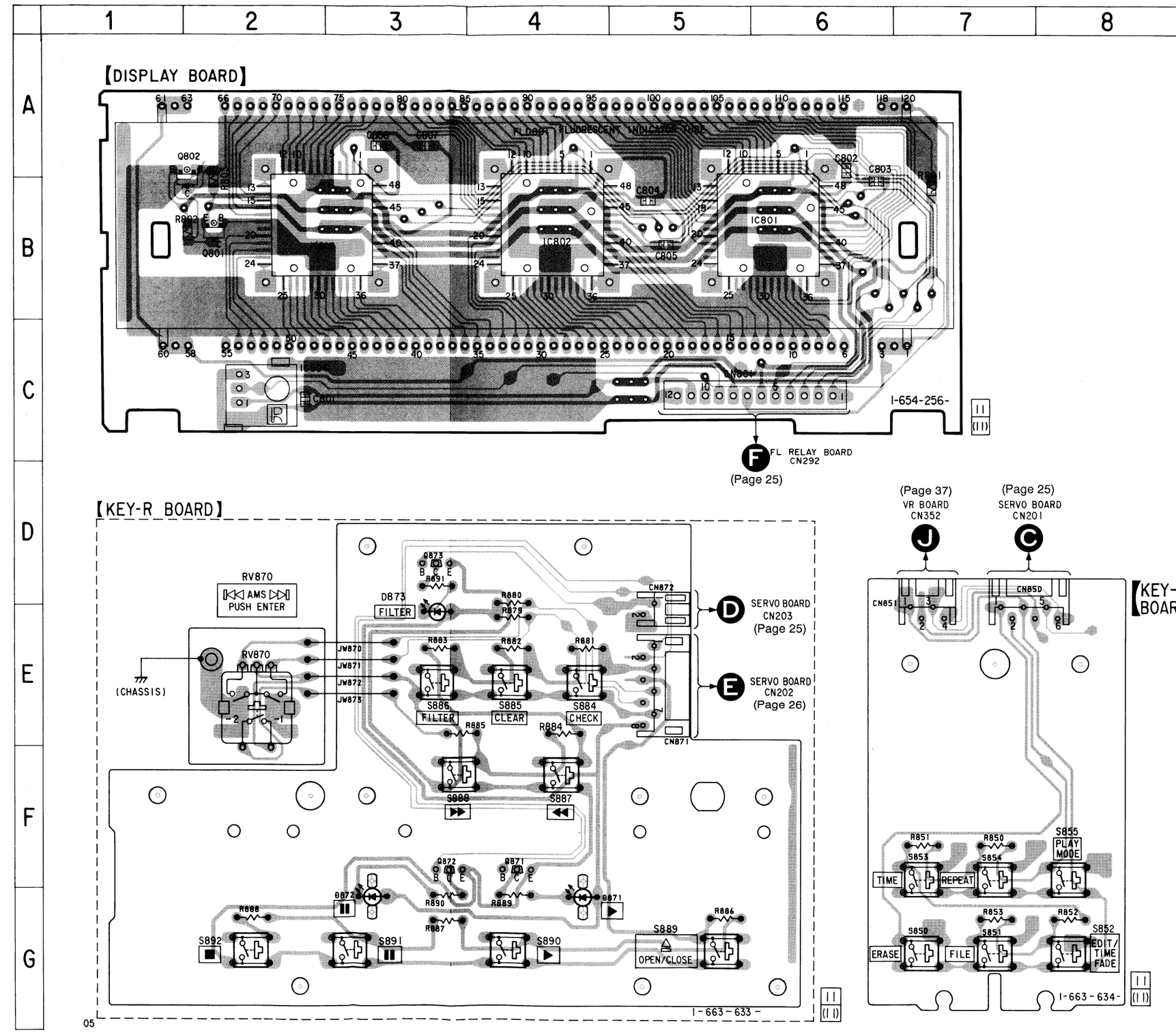
- ○——— : parts extracted from the component side.
- ——— : parts extracted from the conductor side.
- ■ : parts mounted on the conductor side.
- ▒▒▒ : Pattern from the side which enables seeing.

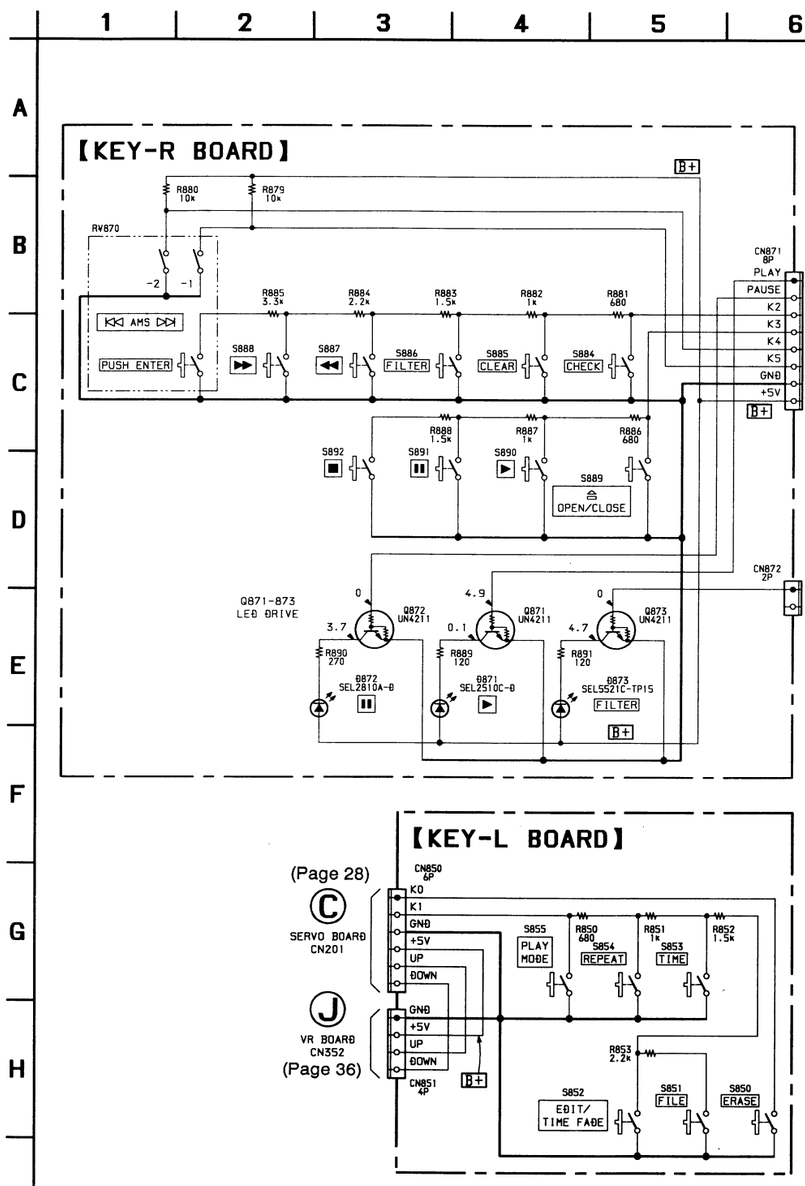
6-5. PRINTED WIRING BOARDS –PANEL Section – • See page 24 for Circuit Boards Location.

• **Semiconductor Location**

Ref. No.	Location
D871	G-4
D872	G-3
D873	E-3
IC801	B-6
IC802	B-4
IC803	B-2
IC804	C-2
Q801	B-2
Q802	A-2
Q871	F-4
Q872	F-3
Q873	D-3

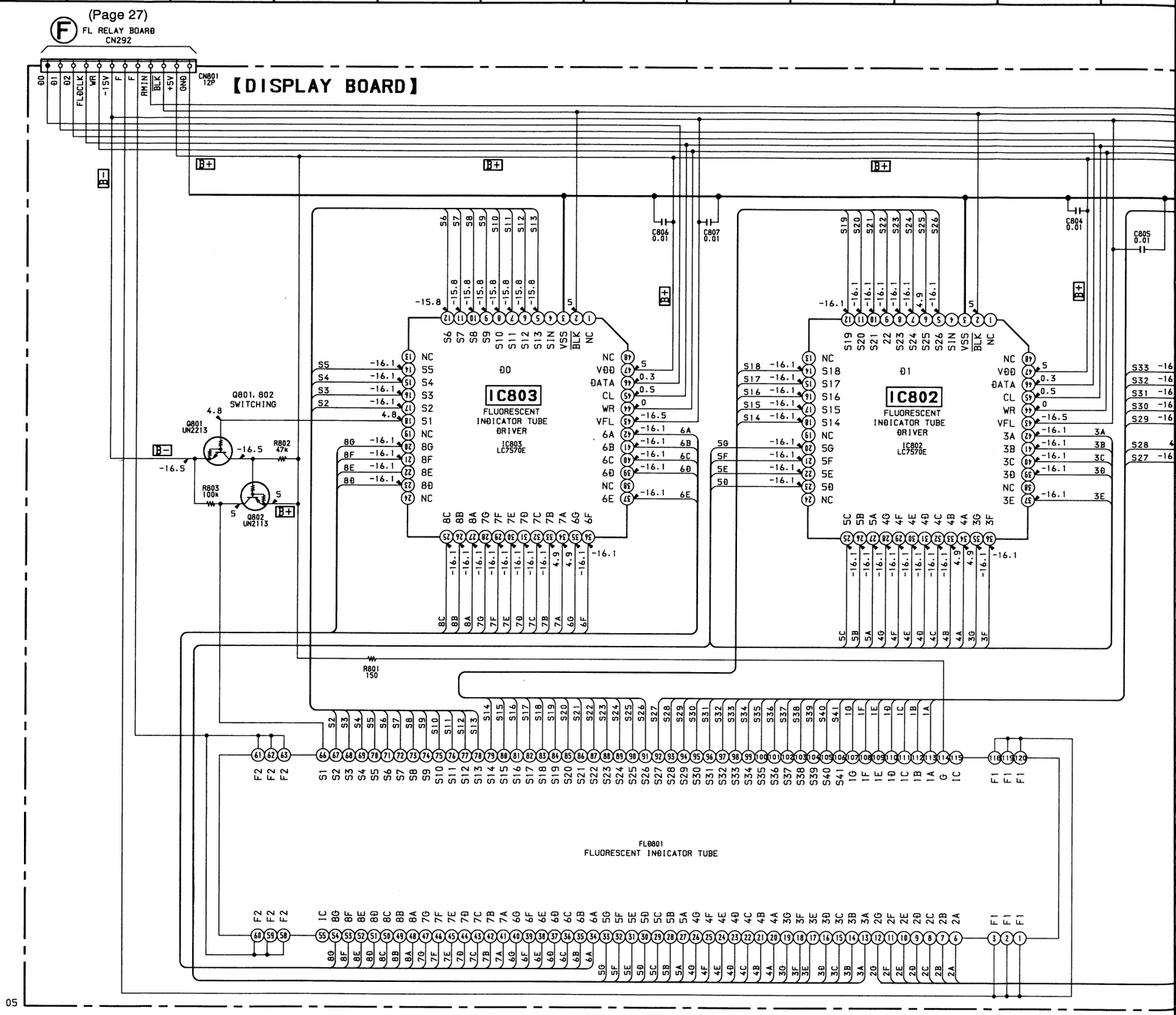
Note on Printed Wiring Board:
- o—— : parts extracted from the component side.
- —— : parts extracted from the conductor side.
- ○ : Through hole.
- ▒▒ : Pattern of the rear side.
- ▒▒ : Pattern from the side which enables seeing.



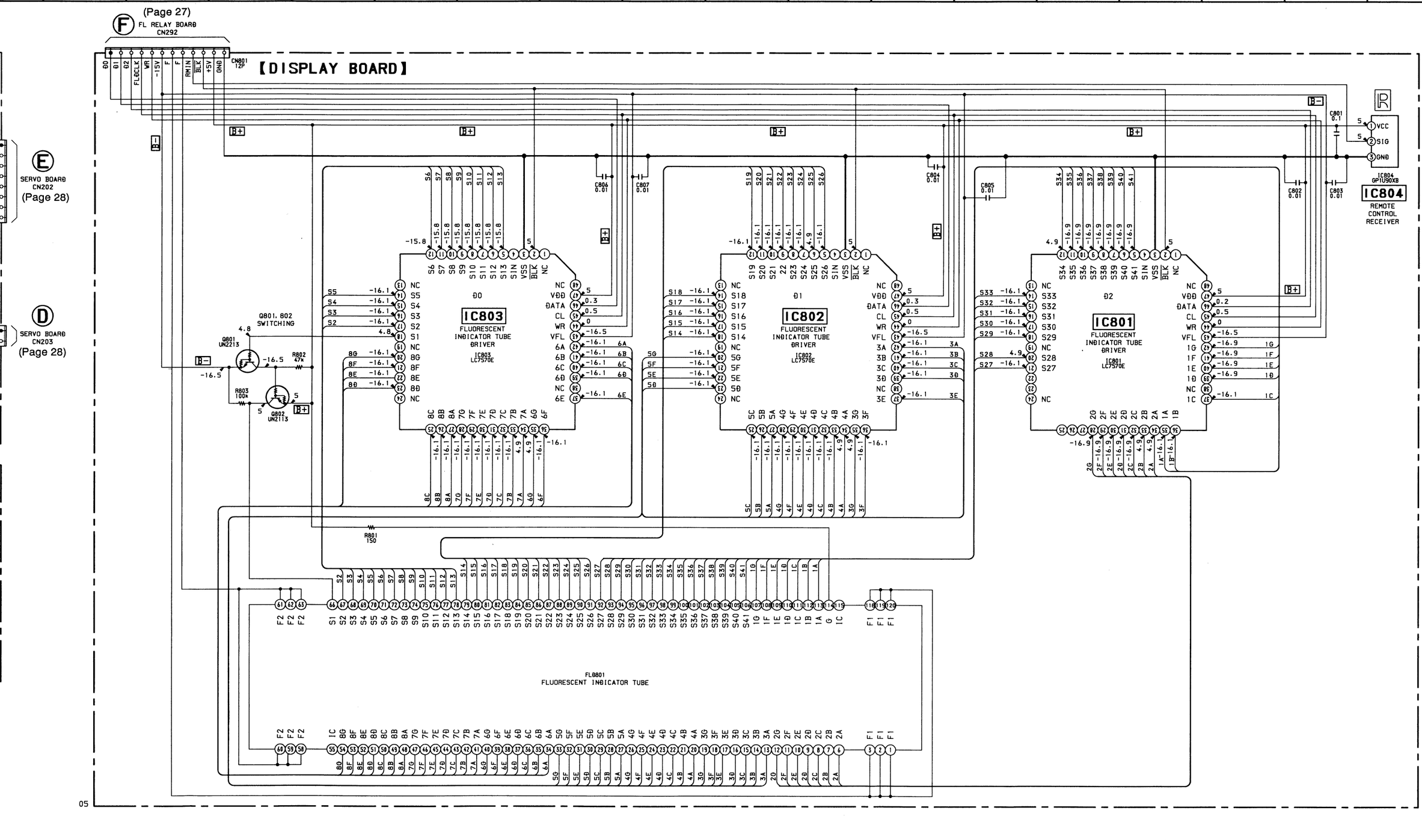


Note on Schematic Diagram:

- All capacitors are in µF unless otherwise noted. pF: µµF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- [ ] : panel designation.
- [B+] : B+ Line.
- [B−] : B− Line.
- Voltages are dc with respect to ground under no-signal conditions.
  no mark : CD PLAY
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.



k Diagrams.

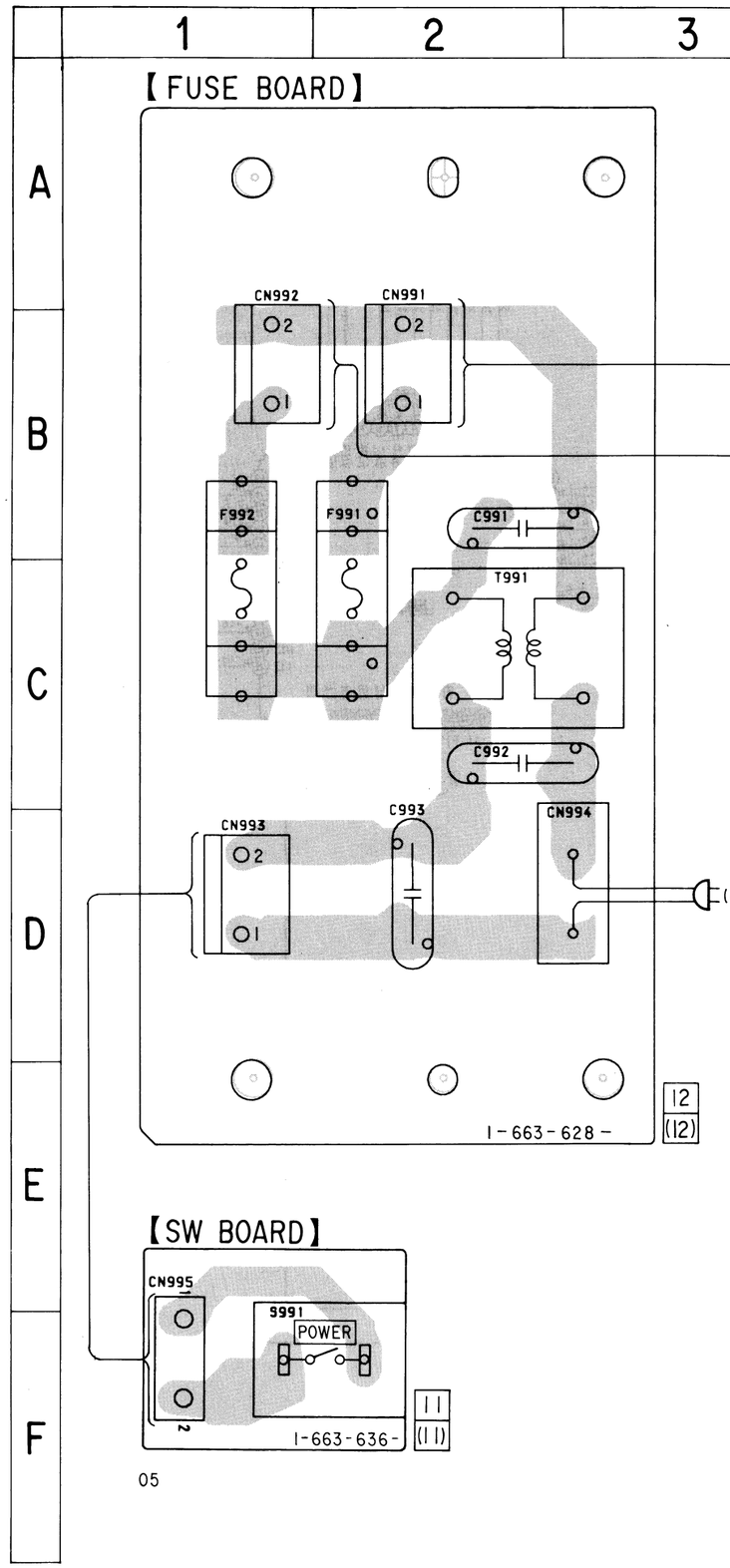

6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
A
B
C
D
E
F
G
H
I
J
(Page 27)
FL RELAY BOARD CN292
CN801 12P
【DISPLAY BOARD】
SERVO BOARD CN202 (Page 28)
SERVO BOARD CN203 (Page 28)
Q801, 802 SWITCHING
Q801 UN2213
Q802 UN2113
R802 47k
R803 100k
R801 150
C801 0.1
C802 0.01
C803 0.01
C804 0.01
C805 0.01
C806 0.01
C807 0.01
IC804 GP1U90XB
IC804 REMOTE CONTROL RECEIVER
IC803 FLUORESCENT INDICATOR TUBE DRIVER IC803 LC7570E
IC802 FLUORESCENT INDICATOR TUBE DRIVER IC802 LC7570E
IC801 FLUORESCENT INDICATOR TUBE DRIVER IC801 LC7570E
FL0801 FLUORESCENT INDICATOR TUBE
B+
B-

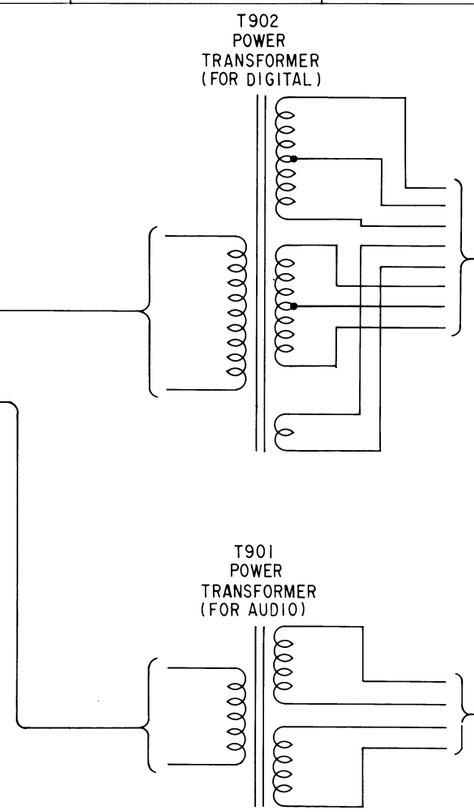
6-7. PRINTED WIRING BOARDS – POWER SUPPLY Section –

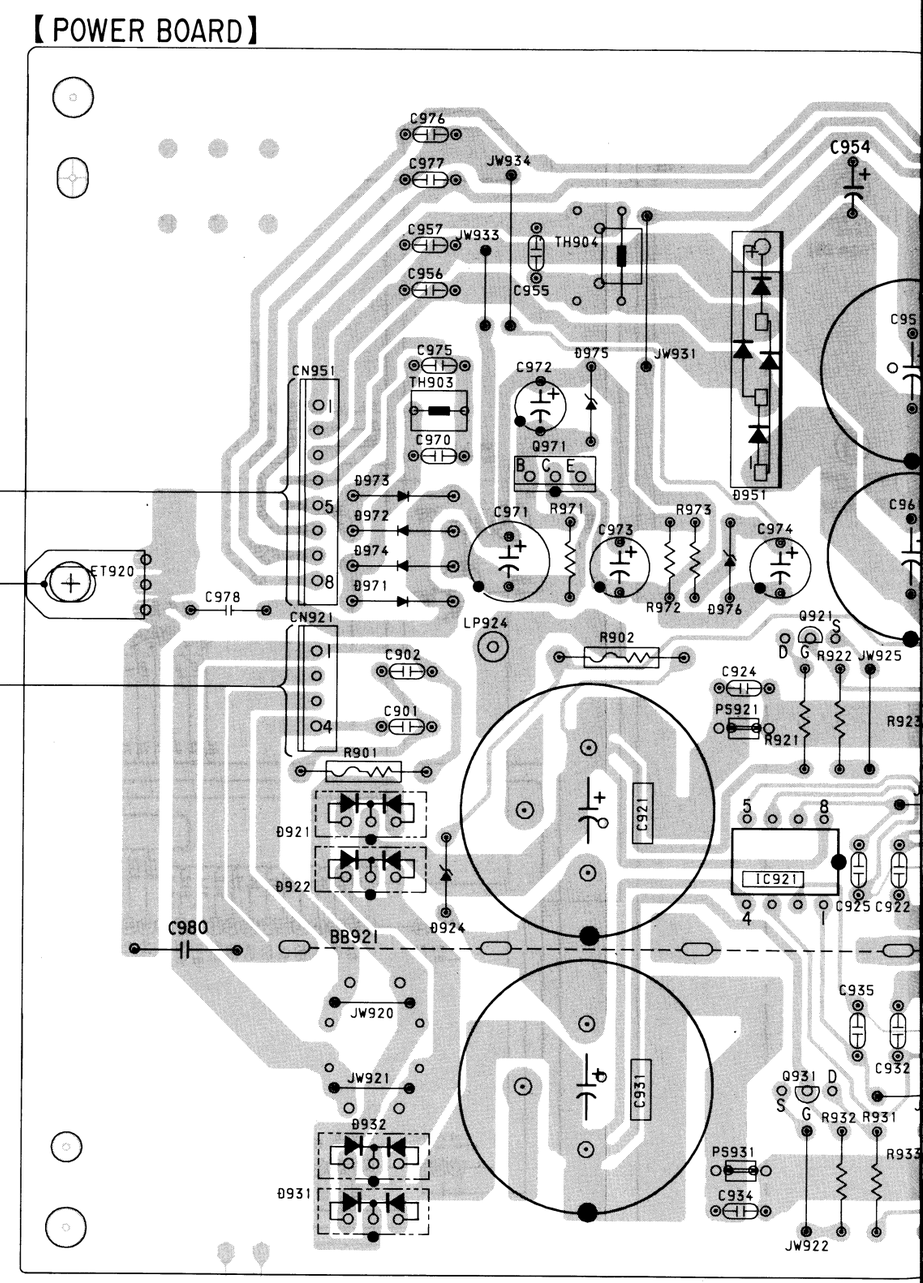
• See page 24 for Circuit Boards Location.

• **Semiconductor Location**

Ref. No.	Location
D921	D-7
D922	D-7
D923	C-9
D924	D-7
D931	E-7
D932	E-7
D933	E-9
D934	F-10
D951	B-9
D952	B-10
D971	C-7
D972	C-7
D973	C-7
D974	C-7
D975	B-8
D976	C-9
IC921	D-9
IC951	B-11
IC952	B-10
IC953	B-11
Q921	C-9
Q922	D-10
Q931	E-9
Q932	E-10
Q971	B-8







Note on Printed Wiring Board:

- ——o—— : parts extracted from the component side.
- ▒▒▒ : Pattern from the side which enables seeing.

3	4	5	6	7	8	9	10	11	12

【POWER BOARD】

T902
POWER
TRANSFORMER
(FOR DIGITAL)

T901
POWER
TRANSFORMER
(FOR AUDIO)

(AC IN)

(CHASSIS)

12
(12)

8 –

SERVO BOARD
CN91
(Page 25)

AUDIO BOARD
CN606
(Page 38)

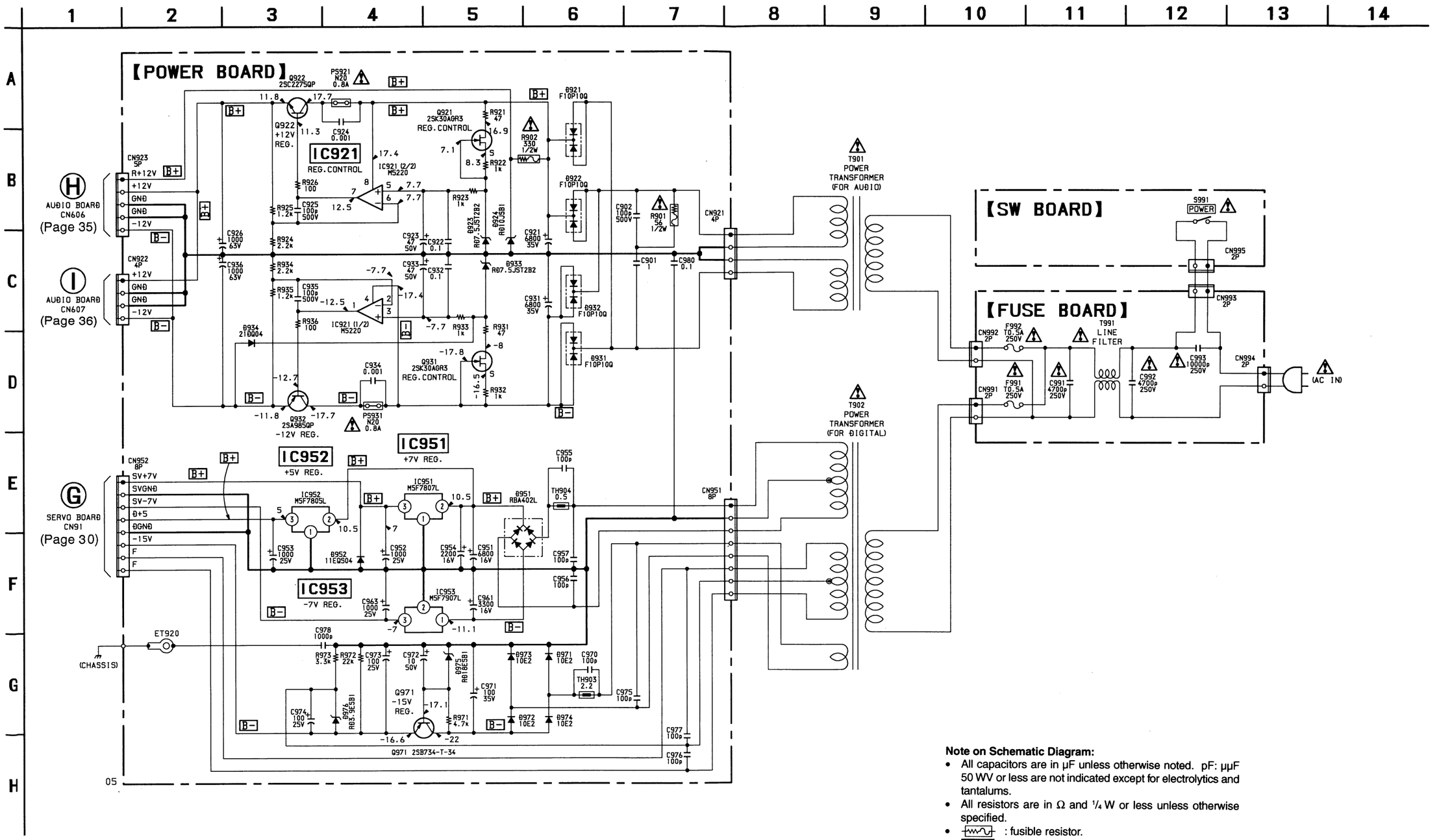
AUDIO BOARD
CN607
(Page 38)

I-663-627-

Note on Printed Wiring Board:

- ——o—— : parts extracted from the component side.
- ▒▒▒ : Pattern from the side which enables seeing.

6-8. SCHEMATIC DIAGRAM – POWER SUPPLY Section –



Note on Schematic Diagram:

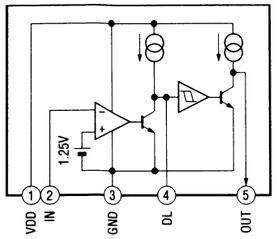
- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⚠ : fusible resistor.
- [ ] : panel designation.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

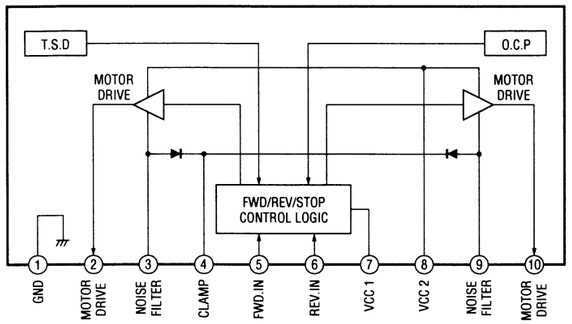
- B+ : B+ Line.
- B– : B– Line.
- Voltages are dc with respect to ground under no-signal conditions.
  no mark : CD PLAY
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.

• IC Block Diagrams
– SERVO Section –

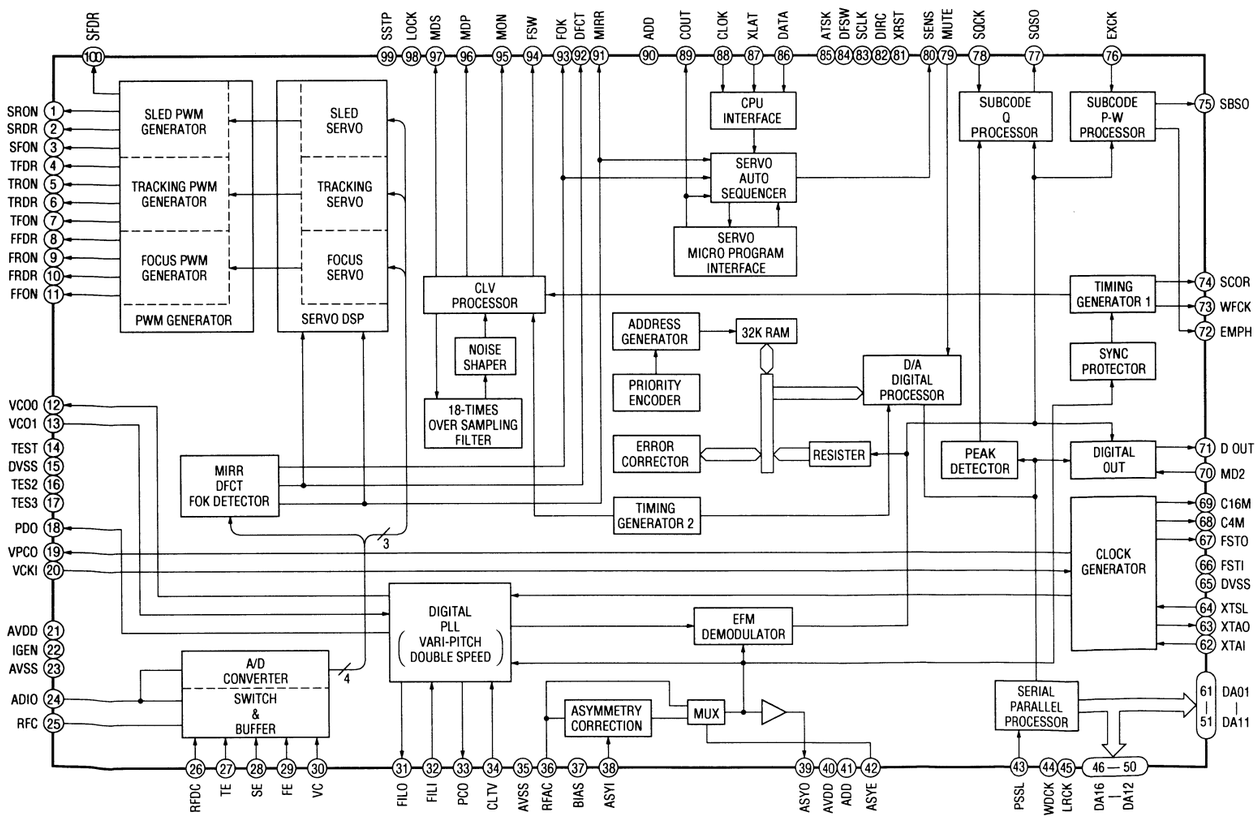
IC91 M51957AL



IC203 LB1641

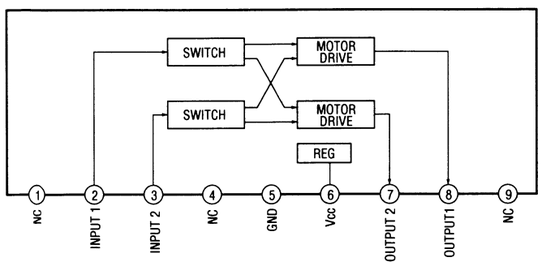


IC101 CXD2545Q

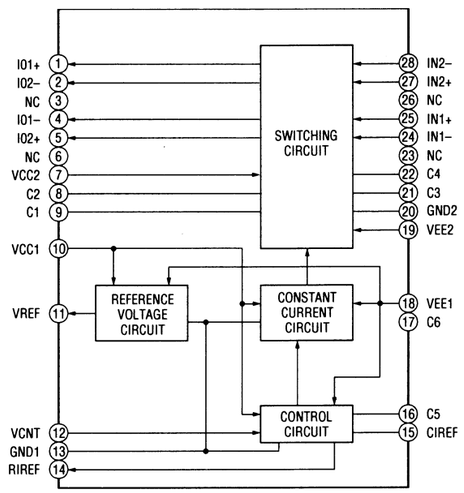


– AUDIO Section –

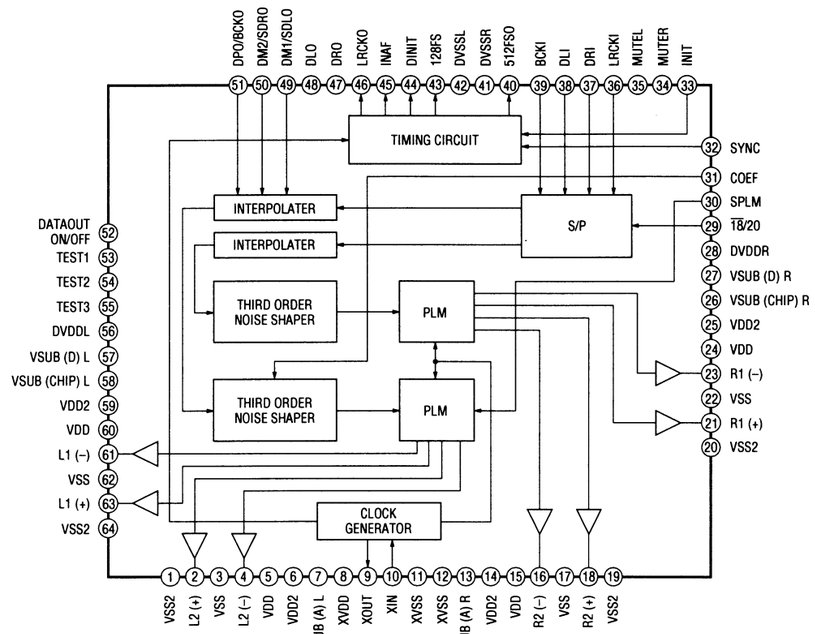
IC350 BA6208



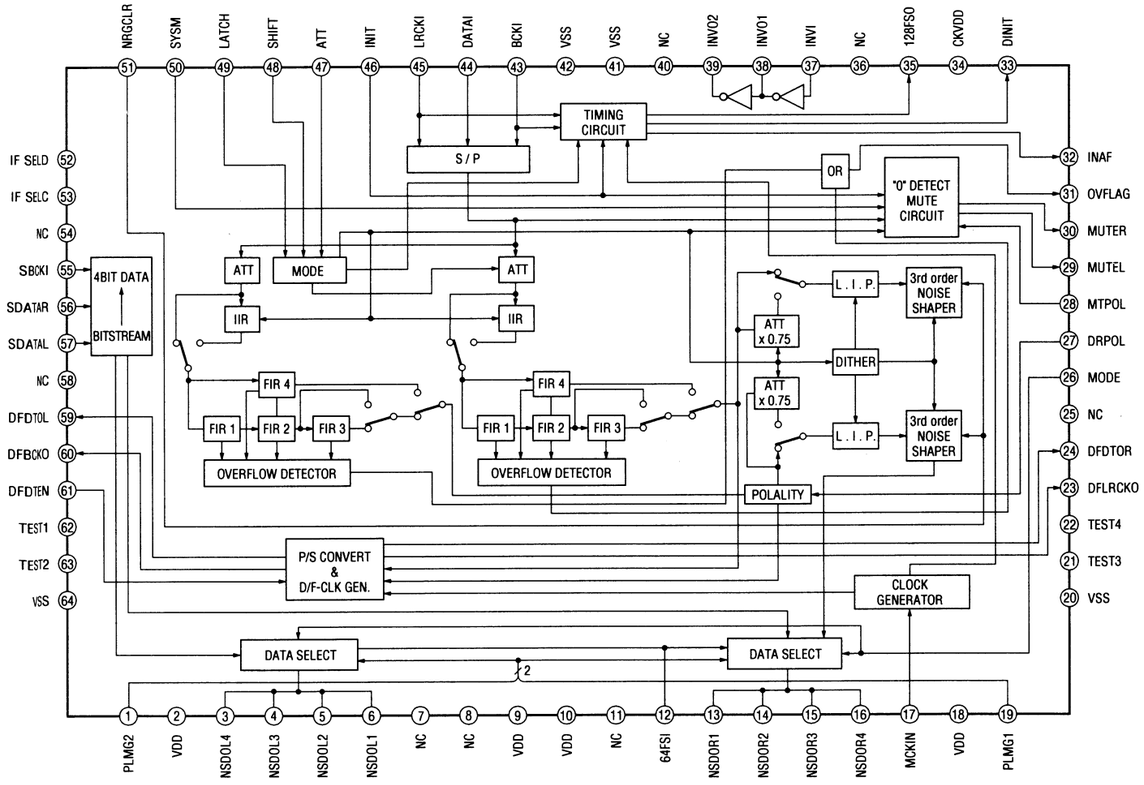
IC404, 504 CXA8042AS



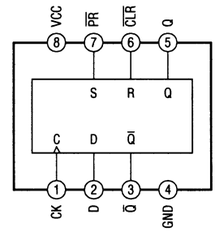
IC603 CXD2562Q-CS



IC601 CXD8679Q

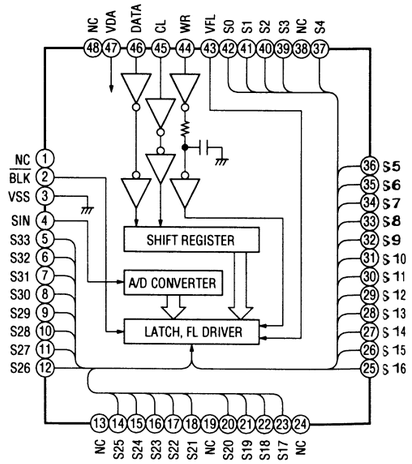


IC610 TC7W74F



– PANEL Section –

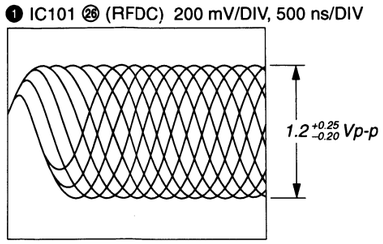
IC801-803 LC7570E



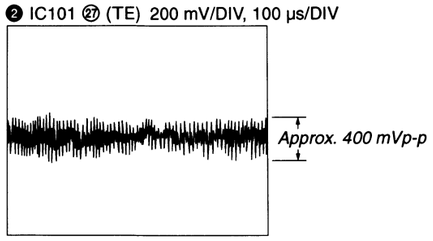
• Waveforms

– SERVO Section –

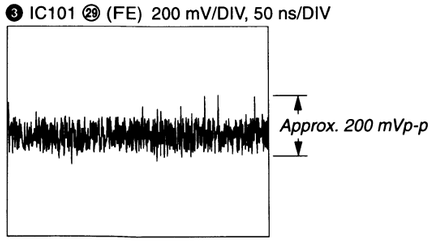
❶ IC101 ㉖ (RFDC) 200 mV/DIV, 500 ns/DIV



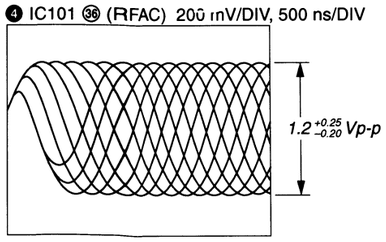
❷ IC101 ㉗ (TE) 200 mV/DIV, 100 µs/DIV



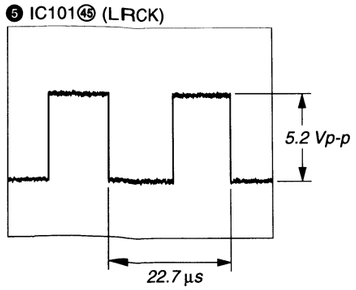
❸ IC101 ㉙ (FE) 200 mV/DIV, 50 ns/DIV



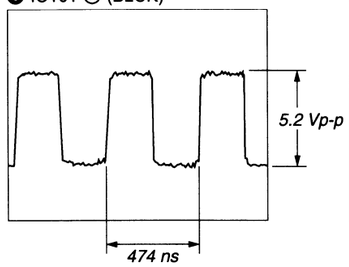
❹ IC101 ㊱ (RFAC) 200 mV/DIV, 500 ns/DIV



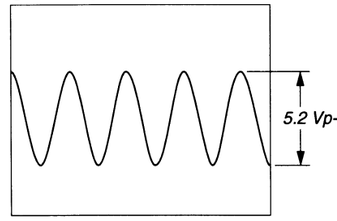
❺ IC101㊺ (LRCK)



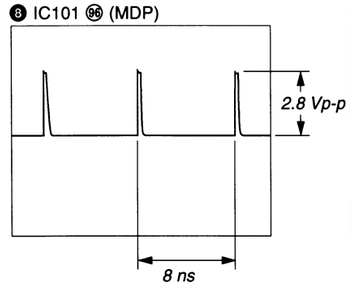
❻ IC101 ㊼ (BLCK)



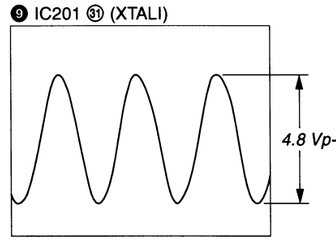
❼ IC101 ㉜ (XTAI)



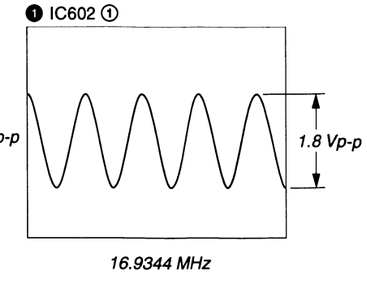
❽ IC101 ㊻ (MDP)



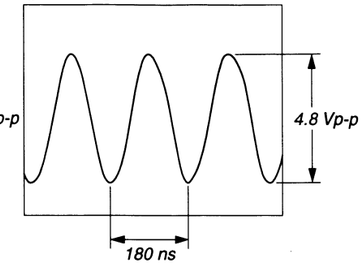
❾ IC201 ㉛ (XTALI)



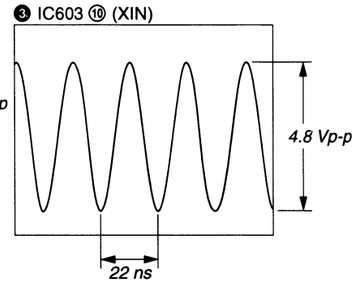
❶ IC602 ①



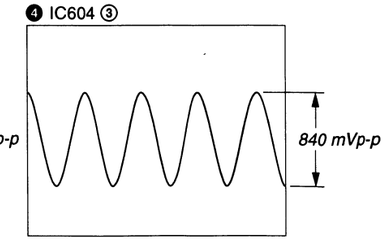
❷ IC602 ⑥



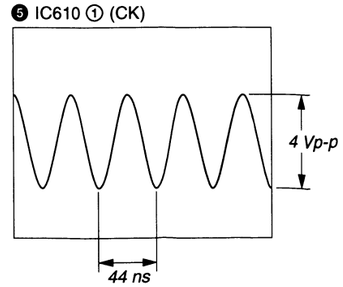
❸ IC603 ⑩ (XIN)



❹ IC604 ③



❺ IC610 ① (CK)



– AUDIO Section –

6-9. IC PIN FUNCTION DESCRIPTION

• SERVO BOARD IC101 CXD2545Q
(DIGITAL SIGNAL PROCESSOR, FOCUS/TRACKING/SLED SERVO, EFM COMPARATOR)

Pin No.	Pin Name	I/O	Function
1	SRON	O	Sled servo drive PWM signal output terminal Not used (open)
2	SRDR	O	Sled servo drive PWM signal (–) output to the BA6297AFP (IC102)
3	SFON	O	Sled servo drive PWM signal output terminal Not used (open)
4	TFDR	O	Tracking servo drive PWM signal (–) output to the BA6297AFP (IC102)
5	TRON	O	Tracking servo drive PWM signal output terminal Not used (open)
6	TRDR	O	Tracking servo drive PWM signal (+) output to the BA6297AFP (IC102)
7	TFON	O	Tracking servo drive PWM signal output terminal Not used (open)
8	FFDR	O	Focus servo drive PWM signal (+) output to the BA6297AFP (IC102)
9	FRON	O	Focus servo drive PWM signal output terminal Not used (open)
10	FRDR	O	Focus servo drive PWM signal (–) output to the BA6297AFP (IC102)
11	FFON	O	Focus servo drive PWM signal output terminal Not used (open)
12	VCOO	O	Oscillator circuit output terminal for analog PLL of the playback EFM Not used (open)
13	VCOI	I	Oscillator circuit input terminal for analog PLL of the playback EFM Not used (fixed at "L")
14	TEST	I	Input terminal for the test (fixed at "L")
15	DVSS	—	Ground terminal (digital system)
16	TES2	I	Input terminal for the test (fixed at "L")
17	TES3	I	Input terminal for the test (fixed at "L")
18	PDO	O	Charge-pump output terminal for analog PLL of the playback EFM Not used (open)
19	VPCO	O	PLL charge-pump output terminal for the variable pitch Not used (open)
20	VCKI	I	Clock signal input from external VCO for the variable pitch Not used (fixed at "L")
21	AVD2	—	Power supply terminal (+5V) (analog system)
22	IGEN	I	Power supply terminal (+5V) (for operational amplifier)
23	AVS2	—	Ground terminal (analog system)
24	ADII	I	Input terminal for the A/D converter Not used (open)
25	ADIO	O	Output terminal of the operational amplifier Not used (open)
26	RFDC	I	RF signal (DC level) input terminal for the digital servo process
27	TE	I	Tracking error signal input from the RF amplifier in optical pick-up
28	SE	I	Sled error signal input from the RF amplifier in optical pick-up
29	FE	I	Focus error signal input from the RF amplifier in optical pick-up
30	VC	I	Middle point voltage (+2.5V) input from the RF amplifier in optical pick-up
31	FILO	O	Filter output terminal for master clock of the playback master PLL
32	FILI	I	Filter input terminal for master clock of the playback master PLL
33	PCO	O	Phase comparison output terminal for master clock of the playback EFM master PLL
34	CLTV	I	Internal VCO control voltage input of the playback master PLL
35	AVS1	—	Ground terminal (analog system)
36	RFAC	I	RF signal (AC level) input terminal for the EFM demodulator
37	BIAS	I	Constant current input terminal of the playback EFM asymmetry circuit
38	ASYI	I	Playback EFM asymmetry comparator voltage input terminal
39	ASYO	O	Playback EFM full-swing output terminal
40	AVD1	—	Power supply terminal (+5V) (analog system)
41	DVDD	—	Power supply terminal (+5V) (digital system)
42	ASYE	I	Playback EFM asymmetry circuit on/off selection input terminal (fixed at "H")
43	PSSL	I	Audio data output mode selection input terminal (fixed at "L")

Pin No.	Pin Name	I/O	Function
44	WDCK	O	Word clock signal (88.2 kHz) output terminal Not used (open)
45	LRCK	O	L/R sampling clock signal (44.1 kHz) output to the CXD8679Q (IC601)
46	DATA	O	DA16 output when PSSL="H", 48-bit slot serial data output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Serial data output to the CXD8679Q (IC601)
47	BCLK	O	DA15 output when PSSL="H", 48-bit slot bit clock signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Bit clock signal (2.8224 MHz) output to the CXD8679Q (IC601)
48	64 DATA	O	DA14 output when PSSL="H", 64-bit slot serial data output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
49	64 BCLK	O	DA13 output when PSSL="H", 64-bit slot bit clock signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
50	64 LRCK	O	DA12 output when PSSL="H", 64-bit slot L/R sampling clock signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
51	GTOP	O	DA11 output when PSSL="H", GTOP signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
52	XUGF	O	DA10 output when PSSL="H", XUGF signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
53	XPLCK	O	DA09 output when PSSL="H", XPLCK signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
54	GFS	O	DA08 output when PSSL="H", GFS (guard frame sync) signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
55	RFCK	O	DA07 output when PSSL="H", RFCK (read frame clock) signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
56	C2PO	O	DA06 output when PSSL="H", C2PO signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
57	XRAOF	O	DA05 output when PSSL="H", XRAOF (RAM over flow) signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
58	MNT3	O	DA04 output when PSSL="H", MNT3 (monitor 3) signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
59	MNT2	O	DA03 output when PSSL="H", MNT2 (monitor 2) signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
60	MNT1	O	DA02 output when PSSL="H", MNT1 (monitor 1) signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
61	MNT0	O	DA01 output when PSSL="H", MNT0 (monitor 0) signal output when PSSL="L" (PSSL (pin ㊸)=fixed at "L") Not used (open)
62	XTAI	I	System clock input terminal (16 MHz)
63	XTAO	O	System clock output terminal (16 MHz) Not used (open)
64	XTSL	I	System clock selection input terminal (fixed at "L")
65	DVSS	—	Ground terminal (digital system)
66	FSTI	I	2/3 divider input terminal of pins ㊷ (XATI) and ㊸ (XTAO)
67	FSTO	O	2/3 divider output terminal of pins ㊷ (XATI) and ㊸ (XTAO)
68	C4M	O	4.2336 MHz clock signal output terminal Not used (open)
69	C16M	O	16.9344 MHz clock signal output terminal Not used (open)
70	MD2	I	Digital out on/off control signal input from the system controller (IC201)
71	DOUT	O	Digital signal (for coaxial out and optical out) output terminal
72	EMPH	O	Emphasis control signal output terminal Not used (open)
73	WFCK	O	Write frame clock signal output terminal Not used (open)
74	SCOR	O	Sub-code sync (S0+S1) detection signal output to the system controller (IC201)

Pin No.	Pin Name	I/O	Function
75	SBSO	O	Sub-code P-W serial data output terminal Not used (open)
76	EXCK	I	Sub-code P-W serial data reading clock signal input terminal Not used (fixed at "L")
77	SUBQ	O	Sub-code Q data signal output to the system controller (IC201)
78	SQCK	I	Sub-code Q data reading clock signal input from the system controller (IC201)
79	MUTE	I	Mute signal input from the system controller (IC201)
80	SENS	O	Internal status (SENSE) signal output to the system controller (IC201)
81	$\overline{\text{XRST}}$	I	System reset signal input from the reset signal generator (IC91) "L": reset For several hundreds msec. after the power supply rises, "L" is input, then it changes to "H"
82	DIRC	I	1-track jump mode input terminal Not used (fixed at "H")
83	SCLK	I	Sense serial data reading clock signal input from the system controller (IC201)
84	DFSW	I	Defect on/off select signal input terminal Not used (fixed at "L")
85	ATSK	I	Input terminal for the anti-shock Not used (fixed at "L")
86	DATA	I	Serial data input from the system controller (IC201)
87	XLAT	I	Serial data latch pulse signal input from the system controller (IC201)
88	CLOK	I	Serial data transfer clock signal input from the system controller (IC201)
89	COUT	O	Track number count signal output terminal Not used (open)
90	DVDD	—	Power supply terminal (+5V) (digital system)
91	MIRR	O	Mirror detection signal output terminal Not used (open)
92	DFCT	O	Defect signal output terminal Not used (open)
93	FOK	O	Focus OK signal output terminal Not used (open)
94	FSW	O	Selection signal output terminal of the output filter for spindle motor Not used (open)
95	MON	O	Spindle motor on/off control signal output terminal Not used (open)
96	MDP	O	Spindle servo control signal output terminal
97	MDS	O	Spindle servo control signal output terminal Not used (open)
98	LOCK	O	GFS is sampled by 460 Hz "H" output when GFS is "H" Not used (open)
99	SSTP	I	Detection input from the sled limit-in detect switch (S22) The optical pick-up is inner position when "H"
100	SFDR	O	Sled servo drive PWM signal (+) output to the BA6297AFP (IC102)

• **SERVO BOARD IC201 CXP84124-068Q (SYSTEM CONTROLLER)**

Pin No.	Pin Name	I/O	Function
1	A3	O	Address signal output to the static RAM (IC202)
2	A4	O	
3	A5	O	
4	A6	O	
5	A7	O	
6	A8	O	
7	A9	O	
8	A10	O	
9	A11	O	
10	A12	O	
11	$\overline{WE}$	O	Write enable signal output to the static RAM (IC202)
12	NC	O	Not used (open)
13	NC	O	Not used (open)
14	LED-PLAY	O	► LED (D871) drive signal output terminal "H": LED on
15	LED-PAUSE	O	❚❚ LED (D872) drive signal output terminal "H": LED on
16	LED-FILTER	O	FILTER LED (D873) drive signal output terminal "H": LED on
17	SPDL-MUTE	O	Mute signal output to the spindle motor driver (IC104, 105)
18	SHIFT-ON/OFF	O	Reset signal output to the CXD2562Q-CS (IC603) "L": reset
19	VOL UP	O	Volume up control signal output to the volume control motor driver (IC350)
20	VOL DOWN	O	Volume down control signal output to the volume control motor driver (IC350)
21	BLANK	O	Blank signal output to the fluorescent indicator tube driver (IC801 to IC803)
22	FL D0	O	Serial data output to the fluorescent indicator tube driver (IC803)
23	FL D1	O	Serial data output to the fluorescent indicator tube driver (IC802)
24	FL D2	O	Serial data output to the fluorescent indicator tube driver (IC801)
25	FL CLK	O	Serial data transfer clock signal output to the fluorescent indicator tube driver (IC801 to IC803)
26	FL WR	O	Read/write select signal output to the fluorescent indicator tube driver (IC801 to IC803)
27	SENSER SW	O	On/off control signal output to the stabilizer detect sensor (IC261) "H": on
28	SENSER	I	Detect signal input from the stabilizer detect sensor (IC261) "H": on
29	LIMIT OUT	I	Detection input from the sled limit-out detect switch (S21) The optical pick-up is outer position when "L"
30	$\overline{RESET}$	I	System reset signal input from the reset signal generator (IC91) "L": reset For several hundreds msec. after the power supply rises, "L" is input, then it changes to "H"
31	XTALI	I	Main system clock input terminal (4 MHz)
32	XTALO	O	Main system clock output terminal (4 MHz)
33	VSS	—	Ground terminal
34	TX	O	Sub system clock output terminal Not used (open)
35	TEX	I	Sub system clock input terminal Not used (fixed at "L")
36	AVSS	—	Ground terminal (for A/D converter)
37	AVREF	I	Reference voltage input terminal (+5V)
38	K0	I	Key input terminal (A/D input) ERASE key (S850) input
39	K1	I	Key input terminal (A/D input) FILE, EDIT/TIME FADE, TIME, REPEAT, P MODE keys (S851 to S855) input
40	K2	I	Key input terminal (A/D input) CHECK, CLEAR, FILTER, ◄◄, ►►, PUSH ENTER keys (S884 to S888, RV870) input

Pin No.	Pin Name	I/O	Function
41	K3	I	Key input terminal (A/D input) ⏏ OPEN/CLOSE, ►, ❚❚, ■ keys (S889 to S892) input
42	K4	I	Rotary encoder input terminal (A/D input) AMS ▷▷❙ key (RV870) input
43	K5	I	Rotary encoder input terminal (A/D input) AMS ❙◁◁ key (RV870) input
44	ADJ/AFJ	I	Setting terminal for the test mode "L" active
45	IN/OUT SW	I	Detection input from the loading in/out detect switch (S281, S282) (A/D input)
46	SCLK	O	Sense serial data reading clock signal output to the CXD2545Q (IC101)
47	PRGL	O	Serial data latch pulse signal output to the CXD8679Q (IC601)
48	CLK	O	Serial data transfer clock signal output to the CXD2545Q (IC101) and CXD8679Q (IC601)
49	SENSE	I	Internal status (SENSE) signal input from the CXD2545Q (IC101)
50	DATA	O	Serial data output to the CXD2545Q (IC101) and CXD8679Q (IC601)
51	SQCK	O	Sub-code Q data reading clock signal output to the CXD2545Q (IC101)
52	SUBQ	I	Sub-code Q data signal input from the CXD2545Q (IC101)
53	TEST	O	Output terminal for the test Not used (open)
54	SEL1	I	Destination setting terminal (fixed at "L")
55	SEL0	I	Destination setting terminal (fixed at "L")
56	RMIN	I	Remote control signal input from the remote control receiver (IC804)
57	TIMER	I	Timer control input terminal Not used (fixed at "H")
58	TEST	O	Output terminal for the test Not used (open)
59	TEST	O	Output terminal for the test Not used (open)
60	SCOR	I	Sub-code sync (S0+S1) detection signal input from the CXD2545Q (IC101)
61	AMUTE	O	Muting control signal output to the analog mute driver and mute relay driver
62	LDON	O	Laser diode on/off selection signal output to the RF amplifier in optical pick-up
63	XLT	O	Serial data latch pulse signal output to the CXD2545Q (IC101)
64	LOAD OUT	O	Loading motor (M271) drive signal output to the LB1641 (IC203) *1
65	LOAD IN	O	Loading motor (M271) drive signal output to the LB1641 (IC203) *1
66	DOUT	O	Digital out on/off control signal output to the CXD2545Q (IC101)
67	DMUTE	O	Muting control signal output to the CXD2545Q (IC101) and CXD8679Q (IC601)
68	D0	I/O	Two-way data bus with the static RAM (IC202)
69	D1	I/O	
70	D2	I/O	
71	D3	I/O	
72	VDD	—	Power supply terminal (+5V)
73	NC	I	Not used (fixed at "H")
74	D4	I/O	Two-way data bus with the static RAM (IC202)
75	D5	I/O	
76	D6	I/O	
77	D7	I/O	
78	A0	O	Address signal output to the static RAM (IC202)
79	A1	O	
80	A2	O	

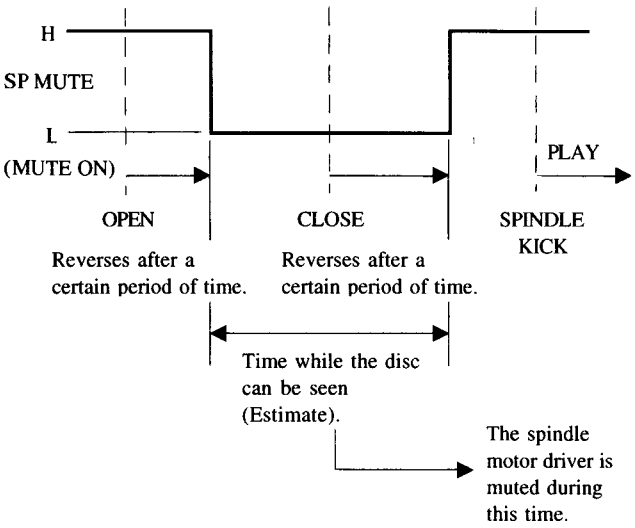
*1 Loading motor (M271) control

Terminal \ Operation	OFF	OUT	IN	BRAKE
LOAD OUT (pin ⑭)	"L"	"H"	"L"	"H"
LOAD IN (pin ⑮)	"L"	"L"	"H"	"H"

• Main Ports

SPDL-MUTE (pin ⑰)

From the viewpoint of performance of the set, the disc must not move nor sway when the disc table opens. These problems however occur in the actual case due to the offset voltage generated and the voltage generated because of the positional relation between the BSL coil and Hall element. The spindle motor driver (IC104, IC105) is therefore muted while the tray is open. Pin ⑰ provides the timing for this.

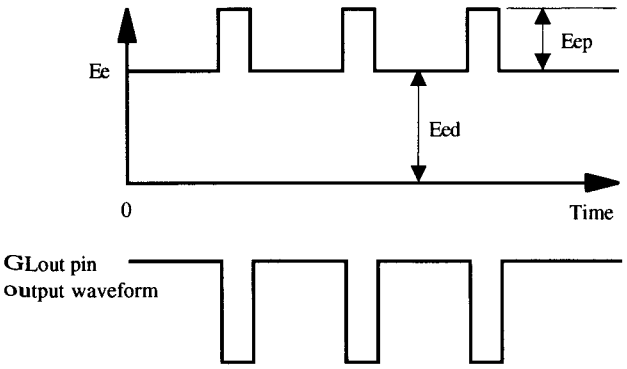


BLANK (pin ㉑)

This port is required because the display tube in this set static-lights up and a dedicated screwdriver is required. It is basically a RESET pin. But as problems will occur if used also as RESET, timings are specially provided using the micro-processor.

SENSER SW (pin ㉗)

As IC261 IS471F operate in pulse as shown in the figure, the sound quality may be affected if operated constantly. As the purpose of IC261 is to detect if the presence of the stabilizer, it should be operated only when the tray is drawn in. IC261 operates as it is "H" only at this time. Normally it is "L".



* Eep is the luminance of the signal light tuned with the low level timing of the GLout pin output.
Eed is the luminance of the D.C. light. The light source is the infrated-emitting diode (λp=940 nm).

SENSER (pin ㉘)

The results of the detection of IC261 IS471F is output to this pin. It becomes "L" when there is no stabilizer (when light reaches). The next process of imposing the next focus is not performed. (Effective only when pin ㉗ is "H".)
Therefore, it must be noted that if PLAY is performed when the servo board at the top of the CDM is not assembled properly, the detection circuit operates and this pin does not operate.
It is does not operate, refer to 1. SERVICING NOTES " Preparations for Adjustment and Measurement" on page 3.

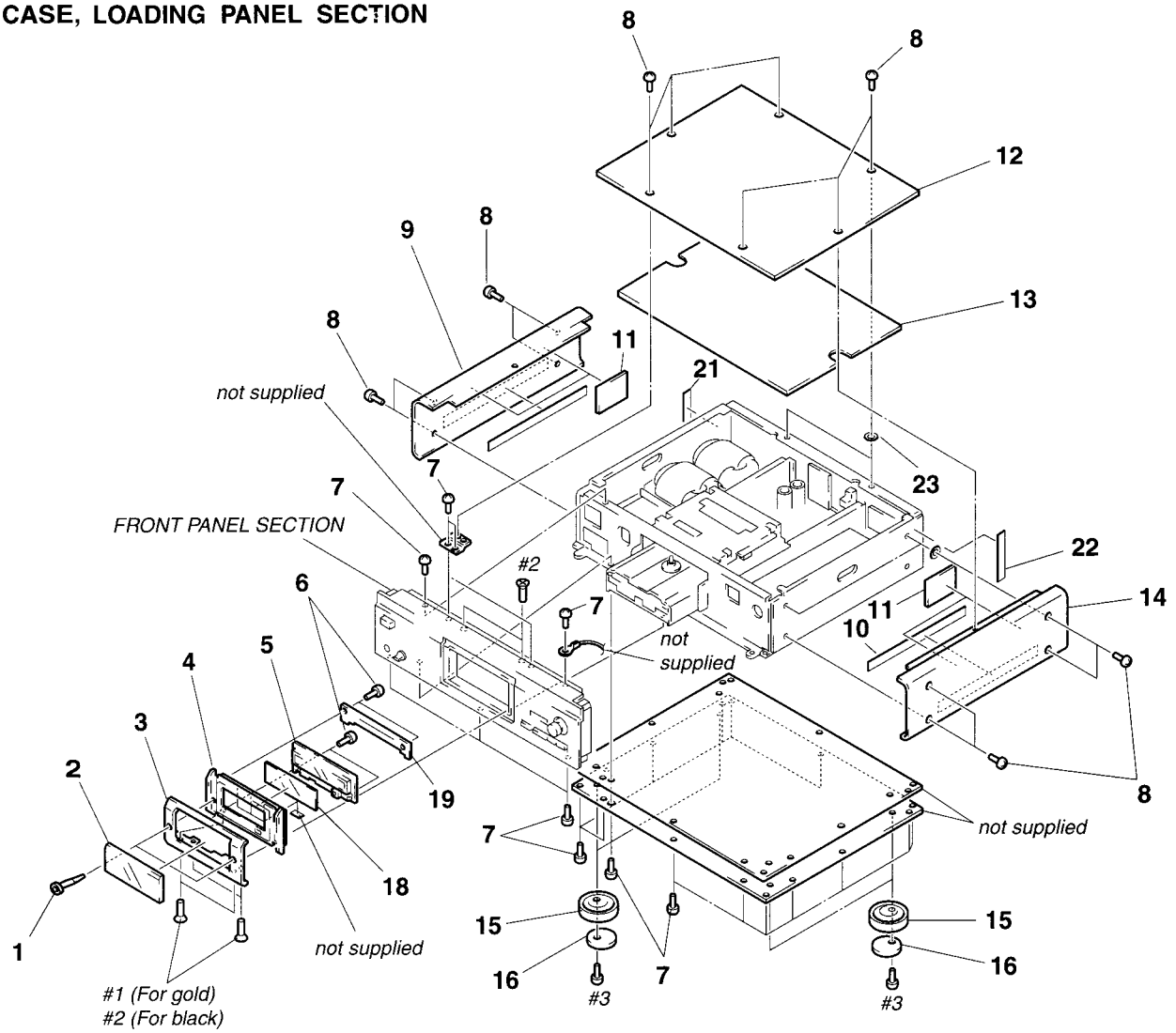
SECTION 7
EXPLODED VIEWS

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE)
  ↑
  Cabinet's Color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of the electrical parts list.

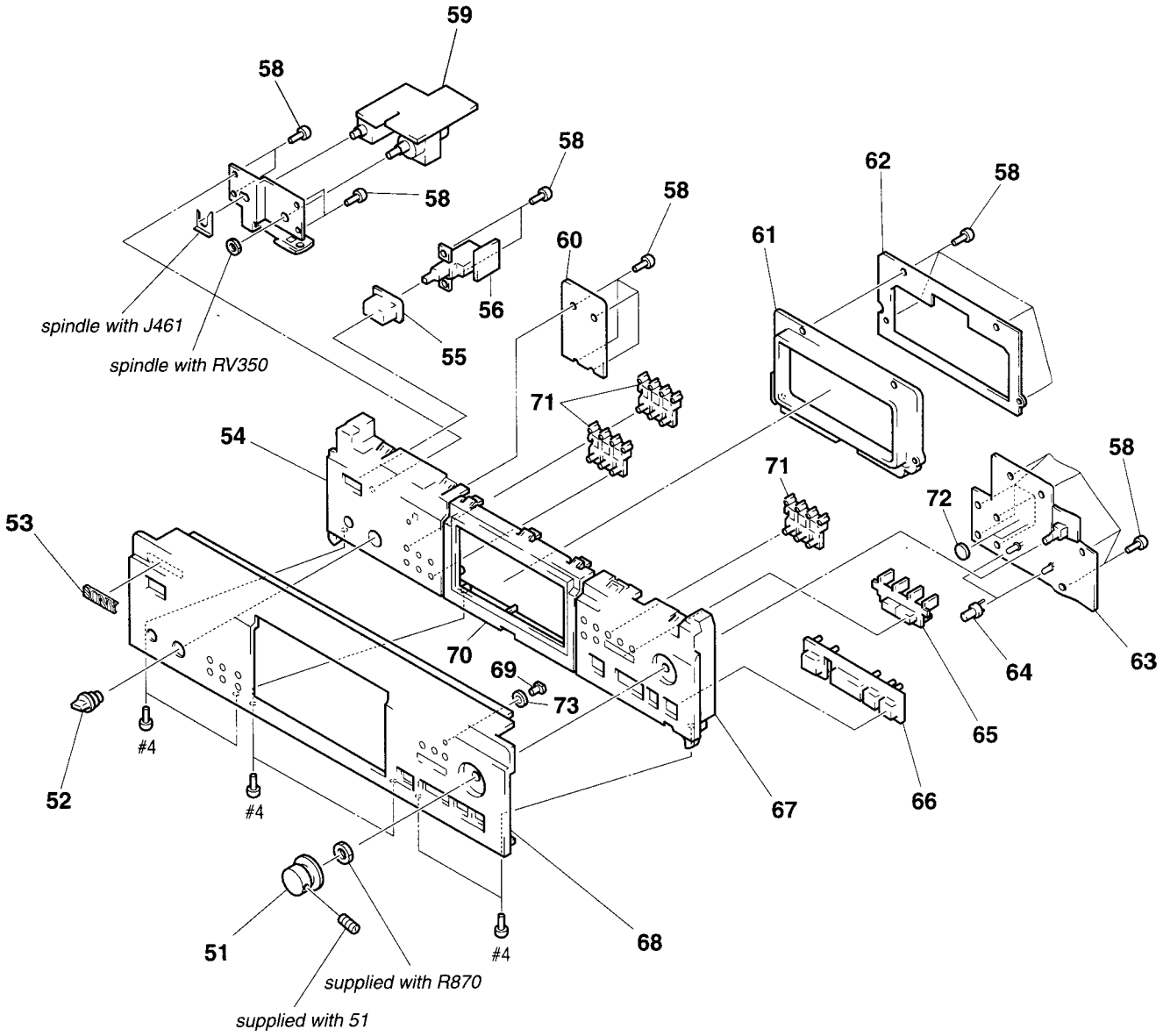
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

(1) CASE, LOADING PANEL SECTION



Ref. No.	Part No.	Description	Remark
1	4-970-998-01	BOLT (LID), HEXAGON HOLE (BLACK)	
1	4-970-998-11	BOLT (LID), HEXAGON HOLE (GOLD)	
2	4-969-832-01	PLATE, INDICATION	
3	4-969-830-21	PANEL, LOADING (BLACK)	
3	4-969-830-31	PANEL, LOADING (GOLD)	
4	4-969-831-21	BASE, LOADING PANEL (BLACK)	
4	4-969-831-31	BASE, LOADING PANEL (GOLD)	
* 5	1-654-256-11	DISPLAY BOARD	
6	4-951-620-41	SCREW (2.6), +BVTP (BLACK)	
6	4-951-620-51	SCREW (2.6), +BVTP (GOLD)	
7	4-929-074-01	SCREW (3X8)	
8	4-976-827-01	SCREW, FLAT HEAD (BLACK)	
8	4-976-827-11	SCREW, FLAT HEAD (GOLD)	
9	4-969-823-01	PLATE (L), SIDE (BLACK)	
9	4-969-823-11	PLATE (L), SIDE (GOLD)	
10	4-972-439-01	SPACER (SCREW HEAD)	
11	4-972-438-01	ABSORBENT, VIBRATION	
12	4-969-821-01	CASE (TOP PLATE) (BLACK)	
12	4-969-821-11	CASE (TOP PLATE) (GOLD)	
* 13	A-4660-735-A	REINFORCEMENT (TOP PLATE) ASSY	
14	4-969-824-01	PLATE (R), SIDE (BLACK)	
14	4-969-824-11	PLATE (R), SIDE (GOLD)	
15	4-970-123-01	FOOT (F50180S)	
16	4-970-124-01	CUSHION (F50180S)	
18	4-969-834-01	FILTER	
19	4-969-833-21	COVER, LOADING PANEL (BLACK)	
19	4-969-833-31	COVER, LOADING PANEL (GOLD)	
20	4-949-302-31	WASHER	
22	4-972-440-01	SPACER	
23	4-949-302-01	WASHER	

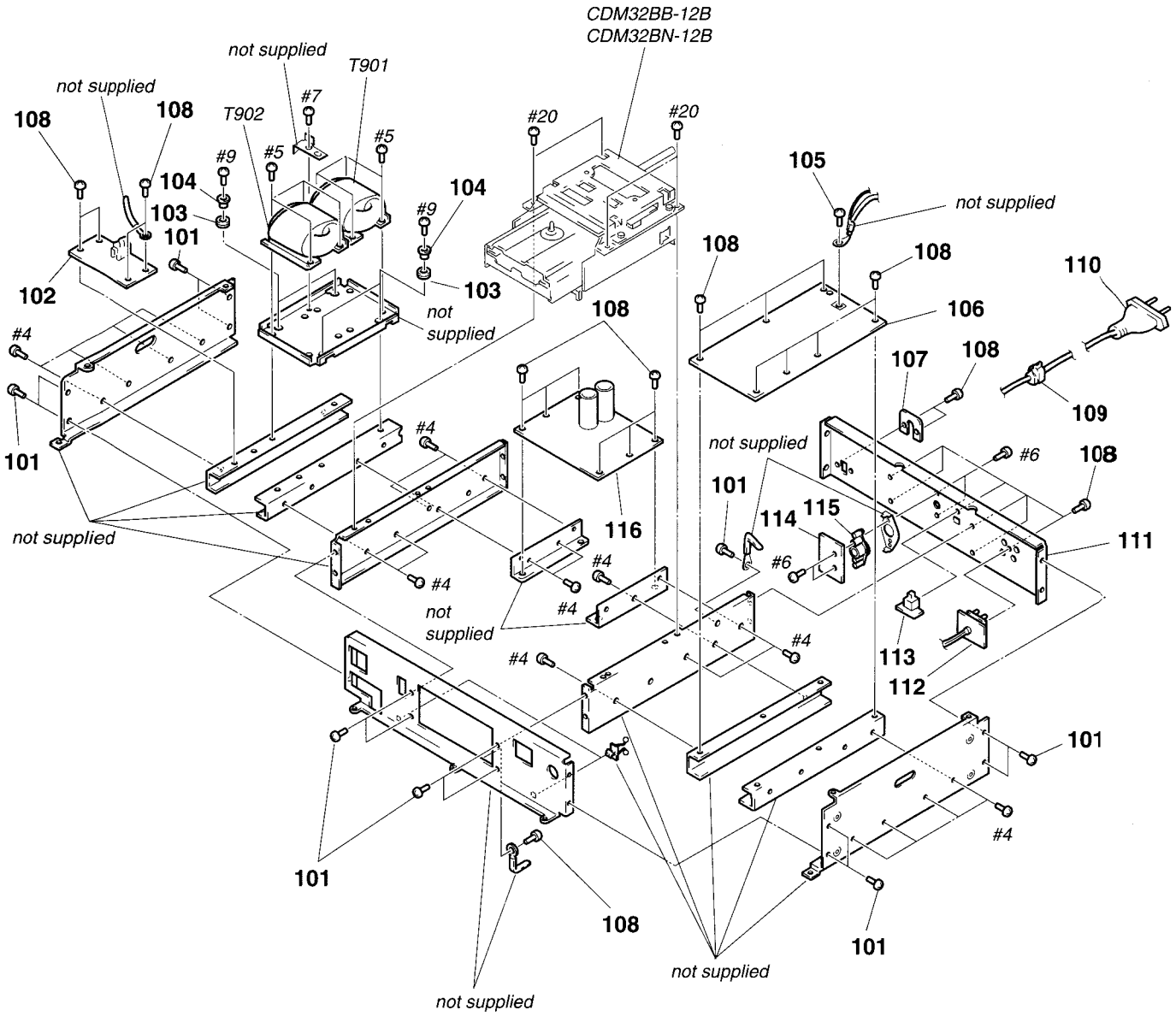
(2) FRONT PANEL SECTION



Ref. No.	Part No.	Description	Remark
51	4-987-121-01	KNOB (AMS) (GOLD)	
51	4-987-121-11	KNOB (AMS) (BLACK)	
52	4-950-189-01	KNOB (A) (VOL) (BLACK)	
52	4-950-189-41	KNOB (A) (VOL) (GOLD)	
53	4-942-568-01	EMBLEM (NO.5), SONY (BLACK)	
53	4-942-568-31	EMBLEM (NO.5), SONY (GOLD)	
54	4-969-470-21	PANEL (L) (GOLD)	
54	4-969-470-32	PANEL (L) (BLACK)	
55	4-923-520-51	KNOB, POWER (POWER) (BLACK)	
55	4-923-520-61	KNOB, POWER (POWER) (GOLD)	
* 56	1-663-636-11	SW BOARD	
* 57	4-969-478-01	BRACKET (HP)	
58	4-951-620-01	SCREW (2.6X8), +BVTP	
* 59	1-663-635-11	VR BOARD	
* 60	A-4699-344-A	KEY-R BOARD, COMPLETE	
61	4-969-818-01	PACKING	
62	4-969-819-11	RETAINER (PACKING)	
* 63	A-4699-345-A	KEY-L BOARD, COMPLETE	

Ref. No.	Part No.	Description	Remark
* 64	3-362-478-01	HOLDER (T), LED	
65	4-986-673-01	BUTTON (FF) (◀◀, ▶▶) (GOLD)	
65	4-986-673-11	BUTTON (FF) (◀◀, ▶▶) (BLACK)	
66	X-4945-276-1	BUTTON (PLAY) ASSY (⏏, OPEN /CLOSE, ▮▮, ■) (BLACK)	
66	X-4948-030-1	PLAY ASSY, BUTTON (⏏, OPEN /CLOSE, ▮▮, ■) (GOLD)	
67	4-986-665-01	BASE (R), PANEL (GOLD)	
67	4-986-665-11	BASE (R), PANEL (BLACK)	
68	4-986-683-01	PANEL, FRONT (GOLD)	
68	4-986-683-11	PANEL, FRONT (BLACK)	
69	4-971-776-01	INDICATOR	
70	4-969-817-01	PANEL (MD) (BLACK)	
70	4-969-817-11	PANEL (MD) (GOLD)	
71	4-986-672-01	BUTTON (3) (GOLD)	
71	4-986-672-11	BUTTON (3) (BLACK)	
* 72	4-922-248-11	SPACER	
73	4-949-302-21	WASHER	

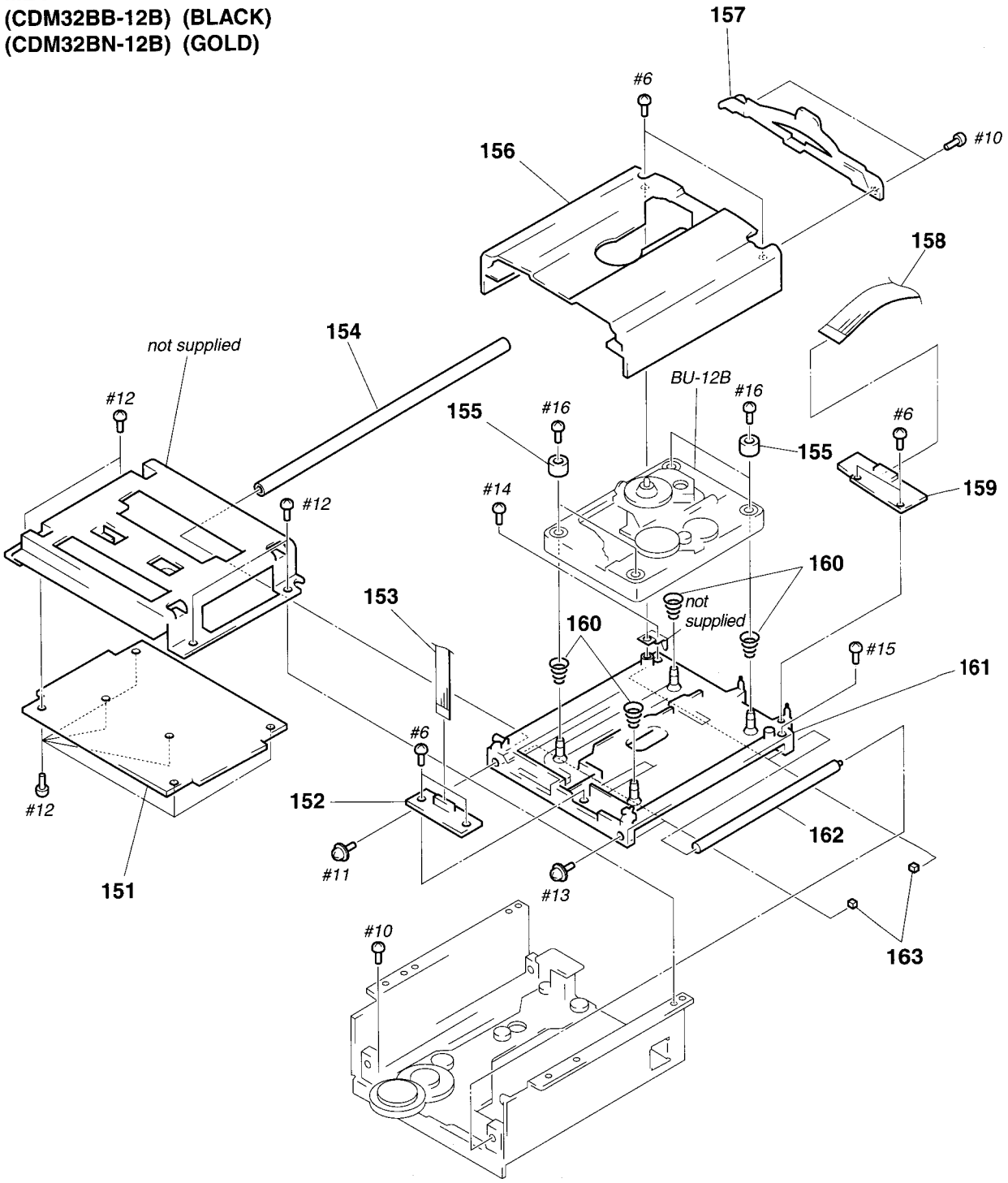
(3) CHASSIS SECTION



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
101	4-929-074-01	SCREW (3X8)	
* 102	1-663-628-11	FUSE BOARD	
* 103	4-888-798-00	BUSHING, RUBBER	
104	4-928-032-01	COLLAR (A)	
105	2-259-121-01	SCREW, TR	
* 106	A-4699-569-A	AUDIO BOARD, COMPLETE	
* 107	4-923-873-01	BRACKET, CORD STOPPER	
108	4-974-510-01	SCREW (+BV 3X8 B)	
* 109	3-703-244-00	BUSHING (2104), CORD	
⚠110	1-558-568-21	CORD, POWER	
* 111	4-986-742-11	PANEL, BACK (AEP)	
* 111	4-986-742-22	PANEL, BACK (Singapore)	
* 112	1-663-629-11	LINE BOARD	
* 113	1-663-630-11	OPT BOARD	
* 114	1-663-631-11	COAX BOARD	
* 115	4-913-152-01	ESCUTCHEON, D/O	
* 116	A-4699-570-A	POWER BOARD, COMPLETE	
⚠T901	1-427-816-11	TRANSFORMER, POWER (for AUDIO)	
⚠T902	1-427-817-11	TRANSFORMER, POWER (for DIGITAL)	

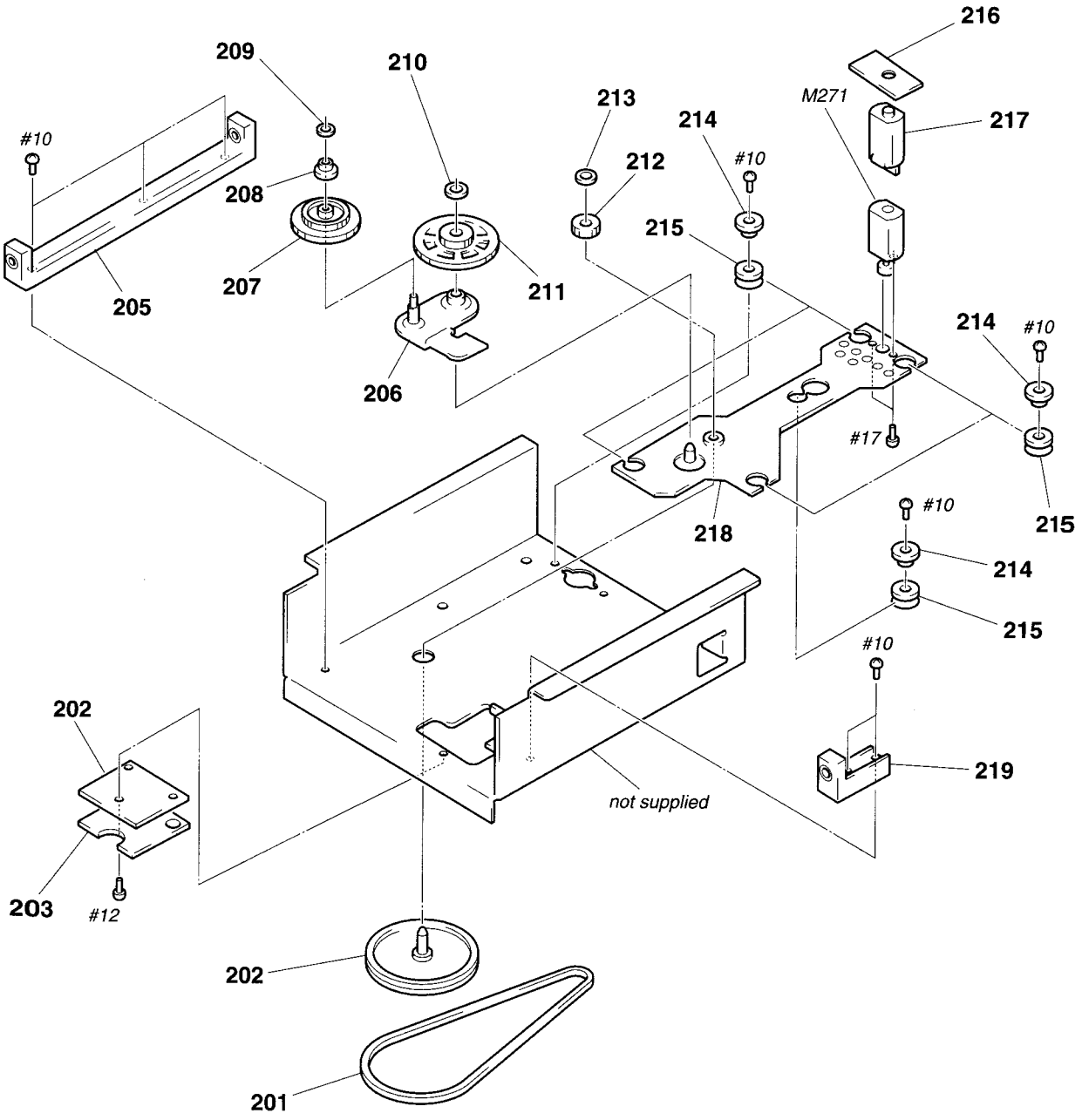
(4) MECHANISM DECK SECTION-1
(CDM32BB-12B) (BLACK)
(CDM32BN-12B) (GOLD)



Ref. No.	Part No.	Description	Remark
* 151	A-4699-587-A	SERVO BOARD, COMPLETE	
* 152	1-653-906-11	FL RELAY BOARD	
153	1-769-109-11	WIRE (FLAT TYPE) (12 CORE)	
* 154	4-968-903-01	SHAFT (MAIN)	
155	4-927-634-01	HOLDER (SP)	
156	4-968-907-11	PANEL (DRAWER)	
157	4-971-000-21	COVER (CD) (BLACK)	

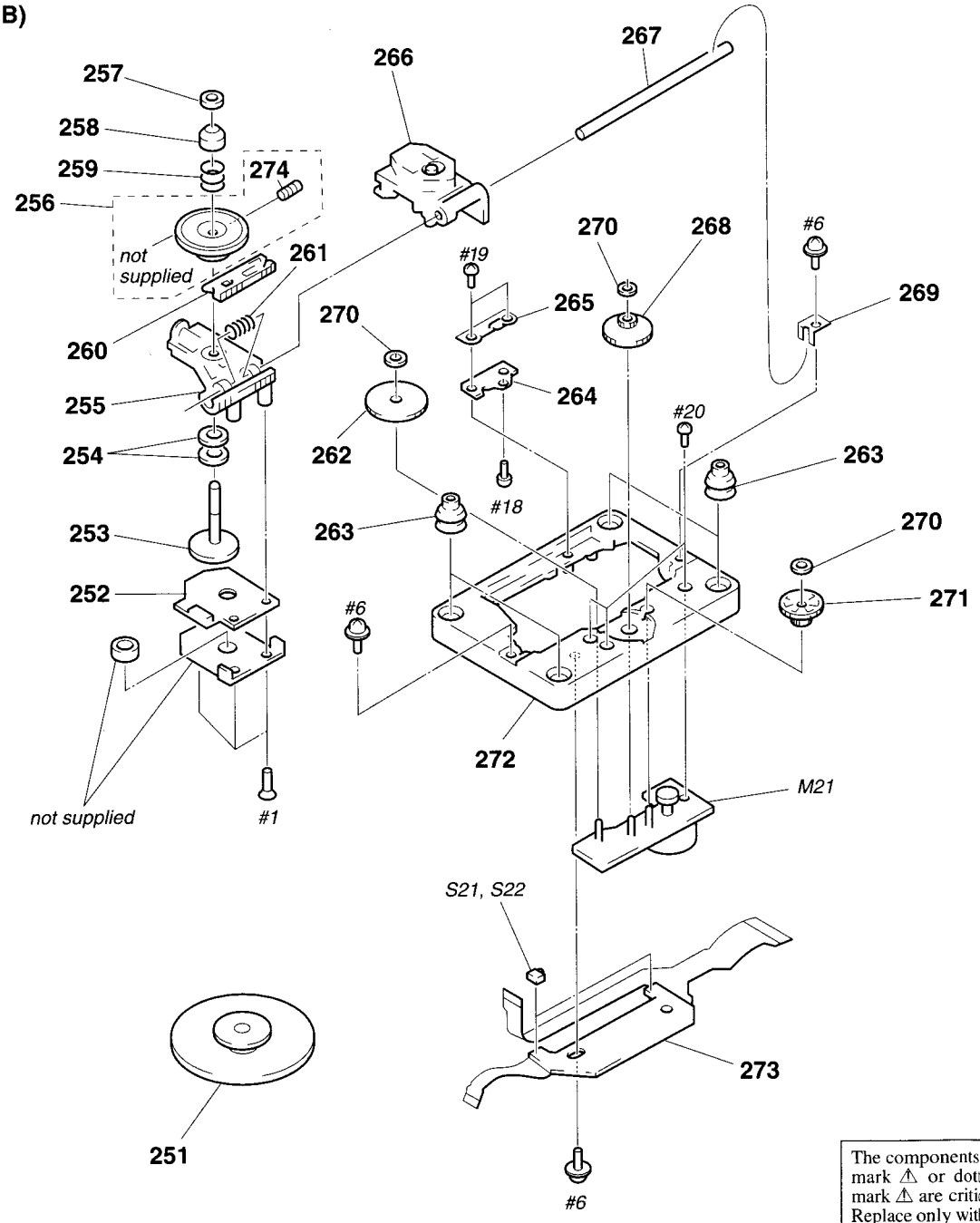
Ref. No.	Part No.	Description	Remark
157	4-971-000-31	COVER (CD) (GOLD)	
158	1-769-110-11	WIRE (FLAT TYPE) (26 CORE)	
* 159	1-654-005-11	FLEX RELAY BOARD	
160	4-948-375-01	SPRING (F), COIL	
* 161	4-968-906-01	HOLDER, BU	
* 162	4-968-904-01	SHAFT (SUB)	
163	4-925-315-31	DAMPER	

(5) MECHANISM DECK SECTION-2
(CDM32BB-12B) (BLACK)
(CDM32BN-12B) (GOLD)



Ref. No.	Part No.	Description	Remark
201	4-968-905-01	BELT (CDM)	
202	X-4945-209-1	PULLEY (FIRST) ASSY	
* 203	4-972-921-01	COVER (SW)	
* 204	1-653-905-11	LOADING SW BOARD	
* 205	4-968-901-01	BEARING (MAIN)	
206	X-4945-207-1	BRACKET (LAST) ASSY	
207	4-968-900-01	GEAR (LAST)	
* 208	4-970-999-01	ROLLER (J RACK)	
209	4-973-849-01	WASHER	
210	3-363-191-01	WASHER (BA)	
211	4-968-899-01	GEAR (MIDLE)	
212	4-968-898-01	GEAR (FIRST)	
213	3-325-697-31	WASHER	
* 214	4-928-026-01	COLLAR (B)	
* 215	4-888-798-11	BUSHING, RUBBER	
* 216	1-653-907-11	LOADING MOTOR BOARD	
217	4-971-894-01	DAMPER (MOTOR)	
218	X-4945-205-1	SHAFT ASSY	
* 219	4-968-902-01	BEARING (SUB)	
M271	X-4945-565-1	MOTOR ASSY (LOADING)	

(6) BASE UNIT SECTION (BU-12B)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
251	A-4660-688-A	STABILIZER ASSY	
* 252	A-4699-545-A	BSL BOARD, COMPLETE	
253	X-4945-273-1	ROTOR ASSY	
254	3-701-444-11	WASHER, 6	
255	X-4945-203-1	BASE ASSY, SLIDE	
256	A-4660-814-A	PULLEY ASSY, DISK	
257	4-968-871-01	WASHER (SPINDLE)	
258	4-968-867-01	CAP, CENTERING	
259	4-968-869-01	SPRING (CENTERING), COMPRESSION	
260	4-968-870-01	RACK, SLIDE	
261	4-968-880-01	SPRING (SLED), COMPRESSION	
262	4-968-866-01	GEAR (D)	
263	4-917-562-21	INSULATOR	
264	4-968-916-01	BRACKET (OP BASE)	
265	4-970-924-01	SPRING (SKEW), LEAF	
⚠266	8-820-014-01	OPTICAL PICK-UP KSS-273B/J1N	
* 267	4-968-944-01	SHAFT, SLED	
268	4-968-865-01	GEAR (C)	
269	4-968-879-01	SPRING (OP), LEAF	
270	3-364-731-01	WASHER, POLY-SLIDER	
271	4-968-864-01	GEAR (B)	
* 272	4-968-862-01	BASE, MECHANICAL	
273	1-653-918-11	FLEXIBLE BOARD	
274	4-971-266-01	SCREW (M2.6X4)	
M21	X-4945-920-1	MOTOR ASSY (SLED)	
S21	1-571-958-11	SWITCH, PUSH (1 KEY) (LIMIT OUT)	
S22	1-571-958-11	SWITCH, PUSH (1 KEY) (LIMIT IN)	

AUDIO

SECTION 8
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service.
  Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: μ, for example:
  uA. . : μA. . uPA. . : μPA. .
  uPB. . : μPB. . uPC. . : μPC. .
  uPD. . : μPD. .
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	A-4699-569-A	AUDIO BOARD, COMPLETE			
		**********			
		< BUS BAR >			
BB601	1-566-940-21	BUS BAR 3P			
		< CAPACITOR >			
C401	1-136-850-11	FILM	0.1uF	5%	63V
C402	1-124-910-11	ELECT	47uF	20%	50V
C403	1-136-850-11	FILM	0.1uF	5%	63V
C404	1-124-910-11	ELECT	47uF	20%	50V
C405	1-136-850-11	FILM	0.1uF	5%	63V
C413	1-136-810-11	FILM	220PF	5%	100V
C414	1-136-810-11	FILM	220PF	5%	100V
C417	1-136-817-91	FILM	0.0033uF	5%	100V
C418	1-136-814-11	FILM	0.001uF	5%	100V
C419	1-104-646-11	CERAMIC	2.2uF	20%	50V
C420	1-117-775-31	FILM	0.1uF	10%	250V
C421	1-128-197-11	ELECT	10uF	20%	63V
C422	1-136-850-11	FILM	0.1uF	5%	63V
C423	1-136-850-11	FILM	0.1uF	5%	63V
C424	1-136-850-11	FILM	0.1uF	5%	63V
C425	1-136-850-11	FILM	0.1uF	5%	63V
C428	1-136-850-11	FILM	0.1uF	5%	63V
C429	1-136-850-11	FILM	0.1uF	5%	63V
C431	1-130-973-00	FILM	0.022uF	3%	100V
C432	1-130-969-11	FILM	0.012uF	3%	100V
C433	1-130-969-11	FILM	0.012uF	3%	100V
C434	1-136-233-11	FILM	0.0047uF	3%	100V
C435	1-136-233-11	FILM	0.0047uF	3%	100V
C436	1-128-200-11	ELECT	47uF	20%	63V
C437	1-128-200-11	ELECT	47uF	20%	63V
C441	1-164-159-11	CERAMIC	0.1uF		50V
C451	1-162-199-31	CERAMIC	10PF	5%	50V
C452	1-126-024-11	ELECT	220uF	20%	25V
C453	1-162-199-31	CERAMIC	10PF	5%	50V
C501	1-136-850-11	FILM	0.1uF	5%	63V
C502	1-124-910-11	ELECT	47uF	20%	50V
C503	1-136-850-11	FILM	0.1uF	5%	63V
C504	1-124-910-11	ELECT	47uF	20%	50V
C505	1-136-850-11	FILM	0.1uF	5%	63V
C513	1-136-810-11	FILM	220PF	5%	100V

Ref. No.	Part No.	Description			Remark
C514	1-136-810-11	FILM	220PF	5%	100V
C517	1-136-817-91	FILM	0.0033uF	5%	100V
C518	1-136-814-11	FILM	0.001uF	5%	100V
C519	1-104-646-11	CERAMIC	2.2uF	20%	50V
C520	1-117-775-31	FILM	0.1uF	10%	250V
C521	1-128-197-11	ELECT	10uF	20%	63V
C522	1-136-850-11	FILM	0.1uF	5%	63V
C523	1-136-850-11	FILM	0.1uF	5%	63V
C524	1-136-850-11	FILM	0.1uF	5%	63V
C525	1-136-850-11	FILM	0.1uF	5%	63V
C528	1-136-850-11	FILM	0.1uF	5%	63V
C529	1-136-850-11	FILM	0.1uF	5%	63V
C530	1-136-850-11	FILM	0.1uF	5%	63V
C531	1-130-973-00	FILM	0.022uF	3%	100V
C532	1-130-969-11	FILM	0.012uF	3%	100V
C533	1-130-969-11	FILM	0.012uF	3%	100V
C534	1-136-233-11	FILM	0.0047uF	3%	100V
C535	1-136-233-11	FILM	0.0047uF	3%	100V
C536	1-128-200-11	ELECT	47uF	20%	63V
C537	1-128-200-11	ELECT	47uF	20%	63V
C541	1-164-159-11	CERAMIC	0.1uF		50V
C551	1-162-199-31	CERAMIC	10PF	5%	50V
C552	1-126-024-11	ELECT	220uF	20%	25V
C553	1-162-199-31	CERAMIC	10PF	5%	50V
C601	1-126-023-11	ELECT	100uF	20%	25V
C602	1-164-732-11	CERAMIC	0.1uF	20%	50V
C603	1-164-159-11	CERAMIC	0.1uF		50V
C604	1-164-732-11	CERAMIC	0.1uF	20%	50V
C605	1-164-159-11	CERAMIC	0.1uF		50V
C606	1-164-732-11	CERAMIC	0.1uF	20%	50V
C607	1-162-290-31	CERAMIC	470PF	10%	50V
C608	1-128-200-11	ELECT	47uF	20%	63V
C609	1-117-775-31	FILM	0.1uF	10%	250V
C610	1-164-732-11	CERAMIC	0.1uF	20%	50V
C611	1-102-947-00	CERAMIC	10PF	5%	50V
C612	1-102-947-00	CERAMIC	10PF	5%	50V
C613	1-128-201-11	ELECT	100uF	20%	63V
C614	1-162-290-31	CERAMIC	470PF	10%	50V
C615	1-164-732-11	CERAMIC	0.1uF	20%	50V
C621	1-117-855-51	ELECT	10uF	20%	50V
C622	1-117-855-51	ELECT	10uF	20%	50V
C623	1-126-023-11	ELECT	100uF	20%	25V
C624	1-126-023-11	ELECT	100uF	20%	25V
C625	1-128-201-11	ELECT	100uF	20%	63V

Ref. No.	Part No.	Description				Remark
C626	1-128-201-11	ELECT	100uF	20%	63V	
C627	1-128-201-11	ELECT	100uF	20%	63V	
C628	1-128-201-11	ELECT	100uF	20%	63V	
C650	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C651	1-164-159-11	CERAMIC	0.1uF		50V	
		< CONNECTOR >				
CN401	1-764-325-11	PIN, CONNECTOR (PCB) (V TYPE) 2P				
CN402	1-764-325-11	PIN, CONNECTOR (PCB) (V TYPE) 2P				
CN501	1-764-325-11	PIN, CONNECTOR (PCB) (V TYPE) 2P				
CN502	1-764-325-11	PIN, CONNECTOR (PCB) (V TYPE) 2P				
* CN601	1-691-462-11	PIN, CONNECTOR (PC BOARD) 6P				
CN602	1-691-463-31	PIN, CONNECTOR (PC BOARD) 7P				
CN608	1-764-326-11	PIN, CONNECTOR (PCB) (V TYPE) 3P				
CN609	1-764-327-11	PIN, CONNECTOR (PCB) (V TYPE) 4P				
CN610	1-764-327-11	PIN, CONNECTOR (PCB) (V TYPE) 4P				
CN611	1-691-459-21	PIN, CONNECTOR (PC BOARD) 3P				
		< DIODE >				
D401	8-719-987-63	DIODE 1N4148M				
D441	8-719-987-63	DIODE 1N4148M				
D501	8-719-987-63	DIODE 1N4148M				
D541	8-719-987-63	DIODE 1N4148M				
D602	8-719-115-65	DIODE RD6.8JS-T2B1				
D603	8-719-987-63	DIODE 1N4148M				
D625	8-719-210-21	DIODE 11EQS04				
D626	8-719-210-21	DIODE 11EQS04				
		< MOUNT/GROUND TERMINAL >				
ET602	4-924-264-01	TERMINAL, MOUNT				
ET650	1-537-770-21	TERMINAL BOARD, GROUND				
ET651	1-537-770-21	TERMINAL BOARD, GROUND				
		< IC >				
IC401	8-759-259-12	IC OPA2604AP				
IC402	8-759-443-33	IC OPA2132PA				
IC403	8-759-053-07	IC OP-27GP				
IC404	8-759-371-51	IC CXA8042AS				
IC501	8-759-259-12	IC OPA2604AP				
IC502	8-759-443-33	IC OPA2132PA				
IC503	8-759-053-07	IC OP-27GP				
IC504	8-759-371-51	IC CXA8042AS				
IC601	8-759-462-70	IC CXD8679Q				
IC602	8-759-242-70	IC TC7WU04F				
IC603	8-759-454-42	IC CXD2562Q-CS				
IC604	8-759-242-70	IC TC7WU04F				
IC605	8-759-231-53	IC TA7805S				
IC606	8-759-981-85	IC RC4556D				
IC607	8-759-604-86	IC M5F7807L				
IC608	8-759-604-90	IC M5F7907L				
IC609	8-759-708-05	IC NJM78L05A				
IC610	8-759-180-84	IC TC7W74F				
		< COIL >				
L403	1-414-514-21	INDUCTOR	10uH			
L404	1-414-512-21	INDUCTOR	6.8uH			
L405	1-412-473-21	INDUCTOR	0uH			
L406	1-412-473-21	INDUCTOR	0uH			
L408	1-414-510-21	INDUCTOR	3.3uH			

Ref. No.	Part No.	Description				Remark
L441	1-414-512-21	INDUCTOR	6.8uH			
L443	1-414-512-21	INDUCTOR	6.8uH			
L451	1-414-512-21	INDUCTOR	6.8uH			
L452	1-414-509-21	INDUCTOR	2.2uH			
L453	1-414-512-21	INDUCTOR	6.8uH			
L503	1-414-514-21	INDUCTOR	10uH			
L504	1-414-512-21	INDUCTOR	6.8uH			
L505	1-412-473-21	INDUCTOR	0uH			
L506	1-412-473-21	INDUCTOR	0uH			
L508	1-414-510-21	INDUCTOR	3.3uH			
L541	1-414-512-21	INDUCTOR	6.8uH			
L543	1-414-512-21	INDUCTOR	6.8uH			
L551	1-414-512-21	INDUCTOR	6.8uH			
L552	1-414-509-21	INDUCTOR	2.2uH			
L553	1-414-512-21	INDUCTOR	6.8uH			
L601	1-414-510-21	INDUCTOR	3.3uH			
L602	1-414-510-21	INDUCTOR	3.3uH			
L603	1-414-510-21	INDUCTOR	3.3uH			
L605	1-414-510-21	INDUCTOR	3.3uH			
		< TRANSISTOR >				
Q405	8-729-224-63	FET	2SK246-BL			
Q441	8-729-900-80	TRANSISTOR	DTC114ES			
Q442	8-729-900-65	TRANSISTOR	DTA144ES			
Q451	8-729-231-55	TRANSISTOR	2SC2878-AB			
Q505	8-729-224-63	FET	2SK246-BL			
Q541	8-729-900-80	TRANSISTOR	DTC114ES			
Q542	8-729-900-65	TRANSISTOR	DTA144ES			
Q551	8-729-231-55	TRANSISTOR	2SC2878-AB			
Q601	8-729-900-65	TRANSISTOR	DTA144ES			
Q607	8-729-900-65	TRANSISTOR	DTA144ES			
		< RESISTOR >				
R401	1-249-913-11	CARBON	390	1%	1/4W	
R402	1-249-913-11	CARBON	390	1%	1/4W	
R403	1-249-885-11	CARBON	27	1%	1/4W	
R404	1-249-885-11	CARBON	27	1%	1/4W	
R409	1-249-946-11	CARBON	9.1K	1%	1/4W	
R410	1-249-946-11	CARBON	9.1K	1%	1/4W	
R411	1-249-946-11	CARBON	9.1K	1%	1/4W	
R412	1-249-946-11	CARBON	9.1K	1%	1/4W	
R413	1-249-923-11	CARBON	1K	1%	1/4W	
R414	1-249-923-11	CARBON	1K	1%	1/4W	
R416	1-249-520-11	CARBON	47	5%	1/4W	
R417	1-249-959-11	CARBON	33K	1%	1/4W	
R418	1-249-931-11	CARBON	2.2K	1%	1/4W	
R427	1-249-637-11	CARBON	33	5%	1/2W	
R429	1-249-979-91	CARBON	220K	1%	1/4W	
R430	1-249-995-11	CARBON	1M	5%	1/4W	
R431	1-249-979-91	CARBON	220K	1%	1/4W	
R432	1-249-977-11	CARBON	180K	1%	1/4W	
R433	1-249-506-11	CARBON	12	5%	1/4W	
R434	1-249-917-11	CARBON	560	1%	1/4W	
R435	1-249-504-11	CARBON	10	5%	1/4W	
R437	1-249-504-11	CARBON	10	5%	1/4W	
R439	1-249-504-11	CARBON	10	5%	1/4W	
R440	1-249-504-11	CARBON	10	5%	1/4W	
R441	1-259-476-11	CARBON	100K	5%	1/6W	

AUDIO **BSL** **COAX**

Ref. No.	Part No.	Description			Remark
R442	1-259-452-11	CARBON	10K	5%	1/6W
R443	1-259-472-11	CARBON	68K	5%	1/6W
R451	1-259-444-11	CARBON	4.7K	5%	1/6W
R452	1-259-476-11	CARBON	100K	5%	1/6W
R453	1-259-456-11	CARBON	15K	5%	1/6W
R454	1-259-464-11	CARBON	33K	5%	1/6W
R455	1-259-468-11	CARBON	47K	5%	1/6W
R456	1-259-396-11	CARBON	47	5%	1/6W
R481	1-259-416-11	CARBON	330	5%	1/6W
R482	1-259-416-11	CARBON	330	5%	1/6W
R483	1-259-416-11	CARBON	330	5%	1/6W
R484	1-259-416-11	CARBON	330	5%	1/6W
R485	1-249-931-11	CARBON	2.2K	1%	1/4W
R491	1-259-440-11	CARBON	3.3K	5%	1/6W
R501	1-249-913-11	CARBON	390	1%	1/4W
R502	1-249-913-11	CARBON	390	1%	1/4W
R503	1-249-885-11	CARBON	27	1%	1/4W
R504	1-249-885-11	CARBON	27	1%	1/4W
R509	1-249-946-11	CARBON	9.1K	1%	1/4W
R510	1-249-946-11	CARBON	9.1K	1%	1/4W
R511	1-249-946-11	CARBON	9.1K	1%	1/4W
R512	1-249-946-11	CARBON	9.1K	1%	1/4W
R513	1-249-923-11	CARBON	1K	1%	1/4W
R514	1-249-923-11	CARBON	1K	1%	1/4W
R516	1-249-520-11	CARBON	47	5%	1/4W
R517	1-249-959-11	CARBON	33K	1%	1/4W
R518	1-249-931-11	CARBON	2.2K	1%	1/4W
R527	1-249-637-11	CARBON	33	5%	1/2W
R529	1-249-979-91	CARBON	220K	1%	1/4W
R530	1-249-995-11	CARBON	1M	5%	1/4W
R531	1-249-979-91	CARBON	220K	1%	1/4W
R532	1-249-977-11	CARBON	180K	1%	1/4W
R533	1-249-506-11	CARBON	12	5%	1/4W
R534	1-249-917-11	CARBON	560	1%	1/4W
R535	1-249-504-11	CARBON	10	5%	1/4W
R537	1-249-504-11	CARBON	10	5%	1/4W
R539	1-249-504-11	CARBON	10	5%	1/4W
R540	1-249-504-11	CARBON	10	5%	1/4W
R541	1-259-476-11	CARBON	100K	5%	1/6W
R542	1-259-452-11	CARBON	10K	5%	1/6W
R543	1-259-472-11	CARBON	68K	5%	1/6W
R551	1-259-444-11	CARBON	4.7K	5%	1/6W
R552	1-259-476-11	CARBON	100K	5%	1/6W
R553	1-259-456-11	CARBON	15K	5%	1/6W
R554	1-259-464-11	CARBON	33K	5%	1/6W
R555	1-259-468-11	CARBON	47K	5%	1/6W
R556	1-259-396-11	CARBON	47	5%	1/6W
R581	1-259-416-11	CARBON	330	5%	1/6W
R582	1-259-416-11	CARBON	330	5%	1/6W
R583	1-259-416-11	CARBON	330	5%	1/6W
R584	1-259-416-11	CARBON	330	5%	1/6W
R585	1-249-931-11	CARBON	2.2K	1%	1/4W
R591	1-259-440-11	CARBON	3.3K	5%	1/6W

Ref. No.	Part No.	Description			Remark
R601	1-259-428-11	CARBON	1K	5%	1/6W
R602	1-259-428-11	CARBON	1K	5%	1/6W
R603	1-259-428-11	CARBON	1K	5%	1/6W
R604	1-259-428-11	CARBON	1K	5%	1/6W
R605	1-259-424-11	CARBON	680	5%	1/6W
R607	1-259-424-11	CARBON	680	5%	1/6W
R608	1-259-420-11	CARBON	470	5%	1/6W
R609	1-259-430-11	CARBON	1.2K	5%	1/6W
R610	1-259-420-11	CARBON	470	5%	1/6W
R611	1-259-420-11	CARBON	470	5%	1/6W
R612	1-249-947-11	CARBON	10K	1%	1/4W
R613	1-259-416-11	CARBON	330	5%	1/6W
R614	1-259-412-11	CARBON	220	5%	1/6W
R615	1-259-448-11	CARBON	6.8K	5%	1/6W
R616	1-259-420-11	CARBON	470	5%	1/6W
⚠R617	1-212-887-00	FUSIBLE	180	5%	1/4W F
R628	1-259-484-11	CARBON	220K	5%	1/6W
R629	1-259-460-11	CARBON	22K	5%	1/6W
R630	1-259-476-11	CARBON	100K	5%	1/6W
⚠R631	1-219-022-11	FUSIBLE	100	5%	1/2W F
⚠R632	1-219-022-11	FUSIBLE	100	5%	1/2W F
		< VIBRATOR >			
X601	1-577-685-11	FILTER, CRYSTAL (16MHz)			
X602	1-579-161-11	VIBRATOR, CRYSTAL (45MHz)			
**********					
*	A-4699-545-A	BSL BOARD, COMPLETE			
		**********			
		< CONNECTOR >			
CN11	1-580-864-11	SOCKET, CONNECTOR (SMT) 10P			
		< HOLE ELEMENT >			
H11	8-719-987-62	DIODE LT140SAZ			
H12	8-719-987-62	DIODE LT140SAZ			
		< RESISTOR/CHIP CONDUCTOR >			
R11	1-216-049-91	METAL CHIP	1K	5%	1/10W
R12	1-216-049-91	METAL CHIP	1K	5%	1/10W
R13	1-216-295-91	CONDUCTOR, CHIP (2012)			
R14	1-216-295-91	CONDUCTOR, CHIP (2012)			
R15	1-216-295-91	CONDUCTOR, CHIP (2012)			
**********					
*	1-663-631-11	COAX BOARD			
		**********			
		< CAPACITOR >			
C702	1-104-645-11	CERAMIC	1uF	20%	50V
C703	1-164-732-11	CERAMIC	0.1uF	20%	50V
C704	1-136-165-00	FILM	0.1uF	5%	50V
C705	1-107-611-11	MICA	100PF	5%	500V
C706	1-164-732-11	CERAMIC	0.1uF	20%	50V

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
C707	1-126-023-11	ELECT	100uF	20%	25V
C708	1-162-282-31	CERAMIC	100PF	10%	50V
		< CONNECTOR >			
CN701	1-580-771-11	PIN, CONNECTOR (PC BOARD) 3P			
CN703	1-580-771-31	PIN, CONNECTOR (PC BOARD) 3P			
		< IC >			
IC702	8-759-242-70	IC TC7WU04F			
		< PIN JACK >			
J701	1-507-567-71	JACK, PIN 1P (DIGITAL OUT COAXIAL)			
		< RESISTOR >			
R701	1-259-401-11	CARBON	75	5%	1/6W
R702	1-259-412-11	CARBON	220	5%	1/6W
		< COIL WITH CORE >			
T701	1-459-795-11	COIL (WITH CORE)			
**********					
*	1-654-256-11	DISPLAY BOARD **********			
*	4-969-510-01	HOLDER (FL)			
		< CAPACITOR >			
C801	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C802	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C803	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C804	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C805	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C806	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C807	1-163-031-11	CERAMIC CHIP	0.01uF		50V
		< FLUORECENT INDICATOR TUBE >			
FLD801	1-517-357-11	INDICATOR TUBE, FLUORESCENT			
		< IC >			
IC801	8-759-324-36	IC LC7570E			
IC802	8-759-324-36	IC LC7570E			
IC803	8-759-324-36	IC LC7570E			
IC804	8-749-923-80	IC GP1U90XB			
		< TRANSISTOR >			
Q801	8-729-421-19	TRANSISTOR UN2213			
Q802	8-729-424-18	TRANSISTOR UN2113-TX			
		< RESISTOR >			
R801	1-216-029-00	METAL CHIP	150	5%	1/10W
R802	1-216-089-00	METAL CHIP	47K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R803	1-216-097-00	METAL CHIP	100K	5%	1/10W
**********					
*	1-653-906-11	FL RELAY BOARD **********			
		< CONNECTOR >			
CN291	1-568-794-11	SOCKET, CONNECTOR 12P			
* CN292	1-568-950-11	PIN, CONNECTOR 12P			
**********					
*	1-654-005-11	FLEX RELAY BOARD **********			
		< CONNECTOR >			
CN191	1-580-473-11	SOCKET, CONNECTOR 26P			
CN192	1-580-460-11	SOCKET, CONNECTOR 26P			
**********					
	1-653-918-11	FLEXIBLE BOARD **********			
		< SWITCH >			
S21	1-571-958-11	SWITCH, PUSH (1 KEY) (LIMIT OUT)			
S22	1-571-958-11	SWITCH, PUSH (1 KEY) (LIMIT IN)			
**********					
*	1-663-628-11	FUSE BOARD **********			
	1-533-233-11	HOLDER, FUSE			
		< CAPACITOR >			
⚠C991	1-113-924-11	CERAMIC	0.0047uF	20%	250V
⚠C992	1-113-924-11	CERAMIC	0.0047uF	20%	250V
⚠C993	1-113-925-11	CERAMIC	0.01uF	20%	250V
		< CONNECTOR >			
* CN991	1-564-321-21	PIN, CONNECTOR 2P			
CN992	1-770-128-11	PIN, CONNECTOR 2P			
CN993	1-564-321-00	PIN, CONNECTOR 2P			
CN994	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P			
		< FUSE >			
⚠F991	1-532-279-00	FUSE, TIME-LAG (T0.5A/250V)			
⚠F992	1-532-279-00	FUSE, TIME-LAG (T0.5A/250V)			
		< LINE FILTER >			
⚠T991	1-421-915-11	COIL, LINE FILTER			
**********					

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

KEY-L **KEY-R** **LINE** **LOADING MOTOR** **LOADING SW**

Ref. No.	Part No.	Description			Remark
*	A-4699-345-A	KEY-L BOARD, COMPLETE			
		**********			
		< CONNECTOR >			
CN850	1-580-774-11	PIN, CONNECTOR (PC BOARD) 6P			
* CN851	1-580-772-11	PIN, CONNECTOR (PC BOARD) 4P			
		< RESISTOR >			
R850	1-249-415-11	CARBON	680	5%	1/4W
R851	1-249-417-11	CARBON	1K	5%	1/4W
R852	1-249-419-11	CARBON	1.5K	5%	1/4W
R853	1-249-421-11	CARBON	2.2K	5%	1/4W
		< SWITCH >			
S850	1-554-303-21	SWITCH, TACTILE (ERASE)			
S851	1-554-303-21	SWITCH, TACTILE (FILE)			
S852	1-554-303-21	SWITCH, TACTILE (EDIT/TIME FADE)			
S853	1-554-303-21	SWITCH, TACTILE (TIME)			
S854	1-554-303-21	SWITCH, TACTILE (REPEAT)			
S855	1-554-303-21	SWITCH, TACTILE (PLAY MODE)			
**********					
*	A-4699-344-A	KEY-R BOARD, COMPLETE			
		**********			
		< CONNECTOR >			
CN871	1-580-775-11	PIN, CONNECTOR (PC BOARD) 8P			
CN872	1-580-770-11	PIN, CONNECTOR (PC BOARD) 2P			
		< DIODE >			
D871	8-719-303-02	LED SEL2510C-D (▶)			
D872	8-719-301-52	LED SEL2810A-C (❚❚)			
D873	8-719-046-41	LED SEL5521C-TP15 (FILTER)			
		< TRANSISTOR >			
Q871	8-729-900-80	TRANSISTOR DTC114ES			
Q872	8-729-900-80	TRANSISTOR DTC114ES			
Q873	8-729-900-80	TRANSISTOR DTC114ES			
		< RESISTOR >			
R879	1-249-429-11	CARBON	10K	5%	1/4W
R880	1-249-429-11	CARBON	10K	5%	1/4W
R881	1-249-415-11	CARBON	680	5%	1/4W
R882	1-249-417-11	CARBON	1K	5%	1/4W
R883	1-249-419-11	CARBON	1.5K	5%	1/4W
R884	1-249-421-11	CARBON	2.2K	5%	1/4W
R885	1-247-843-11	CARBON	3.3K	5%	1/4W
R886	1-249-415-11	CARBON	680	5%	1/4W
R887	1-249-417-11	CARBON	1K	5%	1/4W
R888	1-249-419-11	CARBON	1.5K	5%	1/4W
R889	1-249-406-11	CARBON	120	5%	1/4W
R890	1-249-410-11	CARBON	270	5%	1/4W
R891	1-249-406-11	CARBON	120	5%	1/4W
		< ROTARY ENCODER >			
RV870	1-475-006-11	ENCODER, ROTARY (⏮ AMS ⏭ PUSH ENTER)			
		< SWITCH >			
S884	1-554-303-21	SWITCH, TACTILE (CHECK)			
S885	1-554-303-21	SWITCH, TACTILE (CLEAR)			
S886	1-554-303-21	SWITCH, TACTILE (FILTER)			
S887	1-554-303-21	SWITCH, TACTILE (◀◀)			
S888	1-554-303-21	SWITCH, TACTILE (▶▶)			
S889	1-554-303-21	SWITCH, TACTILE (⏏ OPEN/CLOSE)			
S890	1-554-303-21	SWITCH, TACTILE (▶)			
S891	1-554-303-21	SWITCH, TACTILE (❚❚)			
S892	1-554-303-21	SWITCH, TACTILE (■)			
**********					
*	1-663-629-11	LINE BOARD			
		**********			
		< CONNECTOR >			
CN471	1-764-341-11	PIN, CONNECTOR (PCB) (L TYPE) 4P			
CN472	1-764-341-31	PIN, CONNECTOR (PCB) (L TYPE) 4P			
CN473	1-580-771-31	PIN, CONNECTOR (PC BOARD) 3P			
		< DIODE >			
D471	8-719-987-63	DIODE 1N4148M			
		< PIN JACK >			
J471	1-568-101-11	JACK, PIN 4P (LINE OUT FIXED/VARIABLE)			
		< RESISTOR >			
R470	1-249-637-11	CARBON	33	5%	1/2W
R471	1-249-528-91	CARBON	100	5%	1/4W
R570	1-249-637-11	CARBON	33	5%	1/2W
R571	1-249-528-91	CARBON	100	5%	1/4W
		< RELAY >			
RY471	1-515-804-11	RELAY			
**********					
*	1-653-907-11	LOADING MOTOR BOARD			
		**********			
		< CONNECTOR >			
CN272	1-506-469-11	PIN, CONNECTOR 4P			
**********					
*	1-653-905-11	LOADING SW BOARD			
		**********			
		< CONNECTOR >			
* CN281	1-568-942-11	PIN, CONNECTOR 4P			
		< RESISTOR >			
R281	1-249-427-11	CARBON	6.8K	5%	1/4W
		< SWITCH >			
S281	1-692-193-11	SWITCH, PUSH (1 KEY) (IN)			
S282	1-692-193-11	SWITCH, PUSH (1 KEY) (OUT)			
S283	1-692-193-11	SWITCH, PUSH (1 KEY) (LD)			
**********					

Ref. No.	Part No.	Description				Remark
*	1-663-630-11	OPT BOARD				
		**********				
		< CAPACITOR >				
C701	1-126-048-81	ELECT	10uF	20%	50V	
		< CONNECTOR >				
CN702	1-691-459-21	PIN, CONNECTOR (PC BOARD) 3P				
		< IC >				
IC701	8-749-921-12	IC GP1F32T (DIGITAL OUT OPTICAL)				
**********						
*	A-4699-570-A	POWER BOARD, COMPLETE				
		**********				
	2-259-121-01	SCREW, TR				
*	4-363-146-00	HEAT SINK, V. OUT				
*	4-941-237-01	HEAT SINK				
		< BUS BAR >				
* BB921	1-566-940-11	BUS BAR 6P				
		< CAPACITOR >				
C901	1-136-177-00	FILM	1uF	5%	50V	
C902	1-107-611-11	MICA	100PF	5%	500V	
C921	1-110-504-11	ELECT	6800uF	20%	35V	
C922	1-136-165-00	FILM	0.1uF	5%	50V	
C923	1-124-724-11	ELECT	47uF	20%	50V	
C924	1-106-343-00	MYLAR	1000PF	5%	200V	
C925	1-107-611-11	MICA	100PF	5%	500V	
C926	1-110-397-11	ELECT	1000uF	20%	63V	
C931	1-110-504-11	ELECT	6800uF	20%	35V	
C932	1-136-165-00	FILM	0.1uF	5%	50V	
C933	1-124-724-11	ELECT	47uF	20%	50V	
C934	1-106-343-00	MYLAR	1000PF	5%	200V	
C935	1-107-611-11	MICA	100PF	5%	500V	
C936	1-110-397-11	ELECT	1000uF	20%	63V	
C951	1-126-017-11	ELECT	6800uF	20%	16V	
C952	1-126-027-11	ELECT	1000uF	20%	25V	
C953	1-126-027-11	ELECT	1000uF	20%	25V	
C954	1-124-556-11	ELECT	2200uF	20%	16V	
C955	1-110-335-11	MYLAR	100PF	5%	50V	
C956	1-110-335-11	MYLAR	100PF	5%	50V	
C957	1-110-335-11	MYLAR	100PF	5%	50V	
C961	1-126-015-11	ELECT	3300uF	20%	16V	
C963	1-126-027-11	ELECT	1000uF	20%	25V	
C970	1-110-335-11	MYLAR	100PF	5%	50V	
C971	1-126-052-11	ELECT	100uF	20%	35V	
C972	1-126-048-81	ELECT	10uF	20%	50V	
C973	1-126-023-11	ELECT	100uF	20%	25V	
C974	1-126-023-11	ELECT	100uF	20%	25V	
C975	1-110-335-11	MYLAR	100PF	5%	50V	
C976	1-110-335-11	MYLAR	100PF	5%	50V	
C977	1-110-335-11	MYLAR	100PF	5%	50V	
C978	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C980	1-164-159-11	CERAMIC	0.1uF		50V	
		< CONNECTOR >				
CN921	1-764-327-11	PIN, CONNECTOR (PCB) (V TYPE) 4P				
CN922	1-770-964-21	PIN, CONNECTOR (PCB) (V TYPE) 4P				
CN923	1-770-965-31	PIN, CONNECTOR (PCB) (V TYPE) 5P				
CN951	1-764-331-31	PIN, CONNECTOR (PCB) (V TYPE) 8P				
* CN952	1-573-267-21	PIN, CONNECTOR 8P				
		< DIODE >				
D921	8-719-210-29	DIODE F10P10Q				
D922	8-719-210-29	DIODE F10P10Q				
D923	8-719-114-49	DIODE RD7.5JS-B2				
D924	8-719-115-98	DIODE RD10JS-T2B1				
D931	8-719-210-29	DIODE F10P10Q				
D932	8-719-210-29	DIODE F10P10Q				
D933	8-719-114-49	DIODE RD7.5JS-B2				
D934	8-719-975-85	DIODE ERB83-004				
D951	8-719-047-31	DIODE RBA-402L				
D952	8-719-210-21	DIODE 11EQS04				
D971	8-719-200-77	DIODE 10E2N				
D972	8-719-200-77	DIODE 10E2N				
D973	8-719-200-77	DIODE 10E2N				
D974	8-719-200-77	DIODE 10E2N				
D975	8-719-113-38	DIODE RD18ES-T2B1				
D976	8-719-111-61	DIODE RD3.9ES-T2B1				
		< GROUND TERMINAL >				
ET920	1-537-770-21	TERMINAL BOARD, GROUND				
		< IC >				
IC921	8-759-602-01	IC M5220P				
IC951	8-759-604-86	IC M5F7807L				
IC952	8-759-231-53	IC TA7805S				
IC953	8-759-604-90	IC M5F7907L				
		< IC LINK >				
⚠PS921	1-532-685-00	LINK, IC (0.8A)				
⚠PS931	1-532-685-00	LINK, IC (0.8A)				
		< TRANSISTOR >				
Q921	8-729-203-05	FET	2SK30A-GR3			
Q922	8-729-107-53	TRANSISTOR	2SC2275-QP			
Q931	8-729-203-05	FET	2SK30A-GR3			
Q932	8-729-141-10	TRANSISTOR	2SA985A-QP			
Q971	8-729-140-97	TRANSISTOR	2SB734-34			

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

POWER **SERVO**

Ref. No.	Part No.	Description				Remark
		< RESISTOR >				
⚠R901	1-219-016-91	FUSIBLE	56	5%	1/2W	F
⚠R902	1-219-034-91	FUSIBLE	330	5%	1/2W	F
R921	1-249-520-11	CARBON	47	5%	1/4W	
R922	1-249-923-11	CARBON	1K	5%	1/4W	
R923	1-249-923-11	CARBON	1K	5%	1/4W	
R924	1-249-560-91	CARBON	2.2K	5%	1/4W	
R925	1-247-714-11	CARBON	1.2K	5%	1/4W	
R926	1-249-528-91	CARBON	100	5%	1/4W	
R931	1-249-520-11	CARBON	47	5%	1/4W	
R932	1-249-923-11	CARBON	1K	5%	1/4W	
R933	1-249-923-11	CARBON	1K	5%	1/4W	
R934	1-249-560-91	CARBON	2.2K	5%	1/4W	
R935	1-247-714-11	CARBON	1.2K	5%	1/4W	
R936	1-249-528-91	CARBON	100	5%	1/4W	
R971	1-259-444-11	CARBON	4.7K	5%	1/6W	
R972	1-259-460-11	CARBON	22K	5%	1/6W	
R973	1-259-440-11	CARBON	3.3K	5%	1/6W	
		< THERMISTOR >				
TH903	1-806-882-11	THERMISTOR, POSITIVE				
TH904	1-808-065-11	THERMISTOR, POSITIVE				
**********						
*	A-4699-587-A	SERVO BOARD, COMPLETE				
		**********				
		< CAPACITOR >				
C93	1-124-995-11	ELECT	220uF	20%	10V	
C94	1-124-995-11	ELECT	220uF	20%	10V	
C95	1-124-995-11	ELECT	220uF	20%	10V	
C96	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V	
C97	1-126-162-11	ELECT	3.3uF	20%	50V	
C101	1-126-177-11	ELECT	100uF	20%	10V	
C102	1-126-177-11	ELECT	100uF	20%	10V	
C103	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V	
C104	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	
C105	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C106	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	
C107	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	
C108	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V	
C109	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C110	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V	
C111	1-164-232-11	CERAMIC CHIP	0.01uF		50V	
C112	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C113	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C114	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C115	1-164-346-11	CERAMIC CHIP	1uF		16V	
C131	1-163-109-00	CERAMIC CHIP	47PF	5%	50V	
C132	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V	
C133	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V	
C134	1-163-109-00	CERAMIC CHIP	47PF	5%	50V	
C135	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	
C136	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	
C137	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	
C138	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	
C139	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C140	1-164-336-11	CERAMIC CHIP	0.33uF		25V	
C141	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V	
C142	1-163-127-00	CERAMIC CHIP	270PF	5%	50V	
C143	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C144	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C145	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C161	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V	
C162	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V	
C163	1-164-492-11	CERAMIC CHIP	0.15uF	10%	16V	
C171	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C172	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C173	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C174	1-164-336-11	CERAMIC CHIP	0.33uF		25V	
C175	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C176	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C177	1-164-336-11	CERAMIC CHIP	0.33uF		25V	
C178	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C201	1-125-622-11	CAPACITOR	0.1F		5.5V	
C202	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C203	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C204	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C251	1-164-232-11	CERAMIC CHIP	0.01uF		50V	
C252	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C261	1-126-177-11	ELECT	100uF	20%	10V	
		< CONNECTOR >				
* CN91	1-573-278-11	PIN, CONNECTOR 8P				
CN101	1-568-795-11	SOCKET, CONNECTOR 12P				
CN102	1-580-473-11	SOCKET, CONNECTOR 26P				
CN103	1-580-781-11	PIN, CONNECTOR (PC BOARD) 7P				
CN104	1-580-774-11	PIN, CONNECTOR (PC BOARD) 6P				
CN105	1-580-771-11	PIN, CONNECTOR (PC BOARD) 3P				
CN201	1-580-774-11	PIN, CONNECTOR (PC BOARD) 6P				
CN202	1-580-775-11	PIN, CONNECTOR (PC BOARD) 8P				
CN203	1-580-770-11	PIN, CONNECTOR (PC BOARD) 2P				
CN251	1-580-774-11	PIN, CONNECTOR (PC BOARD) 6P				
		< DIODE >				
D201	8-719-914-44	DIODE DAP202K				
D202	8-719-976-96	DIODE DTZ4.7C				
D261	8-719-938-07	LED GL480 (STABILIZER DETECT)				
		< IC >				
IC91	8-759-636-16	IC M51957AL				
IC101	8-752-369-78	IC CXD2545Q				
IC102	8-759-071-79	IC BA6297AFP				

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
IC103	8-759-100-96	IC uPC4558G2			
IC104	8-759-071-79	IC BA6297AFP			
IC105	8-759-071-79	IC BA6297AFP			
IC201	8-752-884-95	IC CXP84124-068Q			
IC202	8-759-336-84	IC LC3564SM-10			
IC203	8-759-822-09	IC LB1641			
IC261	8-749-010-61	IC IS471F			
		< TRANSISTOR >			
Q101	8-729-424-18	TRANSISTOR UN2113-TX			
Q102	8-729-421-19	TRANSISTOR UN2213			
Q103	8-729-424-18	TRANSISTOR UN2113-TX			
Q104	8-729-421-19	TRANSISTOR UN2213			
Q201	8-729-424-08	TRANSISTOR UN2111			
Q202	8-729-421-22	TRANSISTOR UN2211			
		< RESISTOR >			
R91	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R92	1-216-077-00	METAL CHIP	15K	5%	1/10W
R93	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R101	1-216-077-00	METAL CHIP	15K	5%	1/10W
R102	1-216-097-00	METAL CHIP	100K	5%	1/10W
R103	1-216-077-00	METAL CHIP	15K	5%	1/10W
R104	1-216-025-00	METAL CHIP	100	5%	1/10W
R105	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R106	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R107	1-216-073-00	METAL CHIP	10K	5%	1/10W
R108	1-216-121-00	METAL CHIP	1M	5%	1/10W
R109	1-216-105-00	METAL CHIP	220K	5%	1/10W
R110	1-216-073-00	METAL CHIP	10K	5%	1/10W
R111	1-216-041-00	METAL CHIP	470	5%	1/10W
R112	1-216-041-00	METAL CHIP	470	5%	1/10W
R113	1-216-041-00	METAL CHIP	470	5%	1/10W
R114	1-216-037-00	METAL CHIP	330	5%	1/10W
R115	1-216-073-00	METAL CHIP	10K	5%	1/10W
R116	1-216-049-00	METAL CHIP	1K	5%	1/10W
R117	1-216-073-00	METAL CHIP	10K	5%	1/10W
R118	1-216-097-00	METAL CHIP	100K	5%	1/10W
R119	1-216-085-00	METAL CHIP	33K	5%	1/10W
R121	1-216-045-00	METAL CHIP	680	5%	1/10W
R131	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R132	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R133	1-216-083-00	METAL CHIP	27K	5%	1/10W
R134	1-216-083-00	METAL CHIP	27K	5%	1/10W
R135	1-216-085-00	METAL CHIP	33K	5%	1/10W
R136	1-216-085-00	METAL CHIP	33K	5%	1/10W
R137	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R138	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R139	1-216-083-00	METAL CHIP	27K	5%	1/10W
R140	1-216-083-00	METAL CHIP	27K	5%	1/10W
R141	1-216-085-00	METAL CHIP	33K	5%	1/10W
R142	1-216-085-00	METAL CHIP	33K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R143	1-216-093-00	METAL CHIP	68K	5%	1/10W
R144	1-216-093-00	METAL CHIP	68K	5%	1/10W
R145	1-216-085-00	METAL CHIP	33K	5%	1/10W
R146	1-216-085-00	METAL CHIP	33K	5%	1/10W
R147	1-216-308-00	METAL CHIP	4.7	5%	1/10W
R148	1-216-073-00	METAL CHIP	10K	5%	1/10W
R149	1-216-073-00	METAL CHIP	10K	5%	1/10W
R150	1-216-073-00	METAL CHIP	10K	5%	1/10W
R151	1-216-097-00	METAL CHIP	100K	5%	1/10W
R152	1-216-001-00	METAL CHIP	10	5%	1/10W
R153	1-216-001-00	METAL CHIP	10	5%	1/10W
R154	1-216-073-00	METAL CHIP	10K	5%	1/10W
R155	1-216-097-00	METAL CHIP	100K	5%	1/10W
R161	1-216-075-00	METAL CHIP	12K	5%	1/10W
R162	1-216-091-00	METAL CHIP	56K	5%	1/10W
R163	1-216-093-00	METAL CHIP	68K	5%	1/10W
R164	1-216-093-00	METAL CHIP	68K	5%	1/10W
R165	1-216-093-00	METAL CHIP	68K	5%	1/10W
R166	1-216-097-00	METAL CHIP	100K	5%	1/10W
R167	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R168	1-216-097-00	METAL CHIP	100K	5%	1/10W
R171	1-216-001-00	METAL CHIP	10	5%	1/10W
R172	1-216-105-00	METAL CHIP	220K	5%	1/10W
R173	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R174	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R175	1-216-105-00	METAL CHIP	220K	5%	1/10W
R176	1-216-308-00	METAL CHIP	4.7	5%	1/10W
R179	1-216-001-00	METAL CHIP	10	5%	1/10W
R180	1-216-105-00	METAL CHIP	220K	5%	1/10W
R181	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R182	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R183	1-216-105-00	METAL CHIP	220K	5%	1/10W
R184	1-216-308-00	METAL CHIP	4.7	5%	1/10W
R201	1-216-013-00	METAL CHIP	33	5%	1/10W
R202	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R203	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R204	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R205	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R206	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R207	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R208	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R209	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R210	1-216-073-00	METAL CHIP	10K	5%	1/10W
R212	1-216-073-00	METAL CHIP	10K	5%	1/10W
R213	1-216-073-00	METAL CHIP	10K	5%	1/10W
R214	1-216-097-00	METAL CHIP	100K	5%	1/10W
R261	1-216-021-00	METAL CHIP	68	5%	1/10W
		< VIBRATOR >			
X201	1-577-082-11	VIBRATOR, CERAMIC (4MHz)			

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SW **VR**

Ref. No.	Part No.	Description				Remark
*	1-663-636-11	SW BOARD				
		********				
*	1-696-874-21	LEAD (WITH CONNECTOR)				
		< SWITCH >				
⚠S991	1-572-267-51	SWITCH, PUSH (AC POWER) (1 KEY)				
**********						
*	1-663-635-11	VR BOARD				
		*********				
*	4-962-201-01	PLATE (HP), GROUND				
		< CAPACITOR >				
C350	1-136-165-00	FILM	0.1uF	5%	50V	
C351	1-136-165-00	FILM	0.1uF	5%	50V	
C461	1-162-290-31	CERAMIC	470PF	10%	50V	
C561	1-162-290-31	CERAMIC	470PF	10%	50V	
		< CONNECTOR >				
CN351	1-764-345-11	PIN, CONNECTOR (PCB) (L TYPE) 8P				
* CN352	1-580-772-11	PIN, CONNECTOR (PC BOARD) 4P				
CN461	1-764-326-11	PIN, CONNECTOR (PCB) (V TYPE) 3P				
		< IC >				
IC350	8-759-962-08	IC BA6208				
		< JACK >				
J461	1-750-162-61	JACK (LARGE TYPE) (PHONES) (BLACK)				
J461	1-779-219-11	JACK (LARGE TYPE) (PHONES) (GOLD)				
		< COIL >				
L461	1-412-473-21	INDUCTOR	0uH			
L561	1-412-473-21	INDUCTOR	0uH			
		< VARIABLE RESISTOR >				
RV350	1-223-747-11	RES, VAR, CARBON 10K/10K				(LINE OUT PHONE LEVEL)
**********						
		MISCELLANEOUS				
		**********				
⚠110	1-558-568-21	CORD, POWER				
153	1-769-109-11	WIRE (FLAT TYPE) (12 CORE)				
158	1-769-110-11	WIRE (FLAT TYPE) (26 CORE)				
⚠266	8-820-014-01	OPTICAL PICK-UP KSS-273B/J1N				
273	1-653-918-11	FLEXIBLE BOARD				
M21	X-4945-920-1	MOTOR ASSY (SLED)				
M271	X-4945-565-1	MOTOR ASSY (LOADING)				
S21	1-571-958-11	SWITCH, PUSH (1 KEY) (LIMIT OUT)				
S22	1-571-958-11	SWITCH, PUSH (1 KEY) (LIMIT IN)				

Ref. No.	Part No.	Description	Remark
⚠T901	1-427-816-11	TRANSFORMER, POWER (for AUDIO)	
⚠T902	1-427-817-11	TRANSFORMER, POWER (for DIGITAL)	
**********			
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-246-14	SCREW +KTP 3X8 TYPE2 NON-SLIT	(for GOLD)
#2	7-682-248-09	SCREW +K 3X8	
#3	7-682-565-09	SCREW +B 4X16	
#4	7-682-548-09	SCREW (3X8)	
#5	7-685-880-09	SCREW +BVTT 4X6 (S)	
#6	7-685-646-79	SCREW, TAPPING	
#7	7-685-871-01	SCREW +BVTT 3X6 (S)	
#9	7-685-873-09	SCREW +BVTT 3X10 (S)	
#10	7-685-647-79	SCREW +P 3X10 TYPE2 NON-SLIT	
#11	7-682-903-01	SCREW +PWH 3X5	
#12	7-685-645-79	SCREW +BVTP 3X6 TYPE2 N-S	
#13	7-682-902-11	SCREW +PWH 2.6X5	
#14	7-621-775-50	SCREW +B 2.6X10	
#15	7-621-772-30	SCREW +B 2X6	
#16	7-685-134-19	SCREW +PTPWH 2.6X8 (TYPE2)	
#17	7-628-253-00	SCREW +PS 2X4	
#18	7-627-852-58	SCREW, PRECISION +P 1.7X5 TYPE3	
#19	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S	
#20	7-685-872-09	SCREW +BVTT 3X8 (S)	
#21	7-685-246-19	SCREW +KTP 3X8 TYPE2 NON-SLIT	(for BLACK)
**********			
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-473-944-11	REMOTE COMMANDER (RM-D950)	
	1-590-925-31	CORD, CONNECTION (AUDIO 1m)	
	3-707-584-21	COVER, BATTERY (for RM-D950)	
	3-858-365-11	MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH, SWEDISH)	
	3-858-365-21	MANUAL, INSTRUCTION (GERMAN, DUTCH, ITALIAN, PORTUGUESE) (AEP)	
	3-858-365-31	MANUAL, INSTRUCTION (CHINESE)	(Singapore)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

97D0569-1
Printed in Japan © 1997. 4
Published by Service and Safety Engineering Dept. (Shibaura)